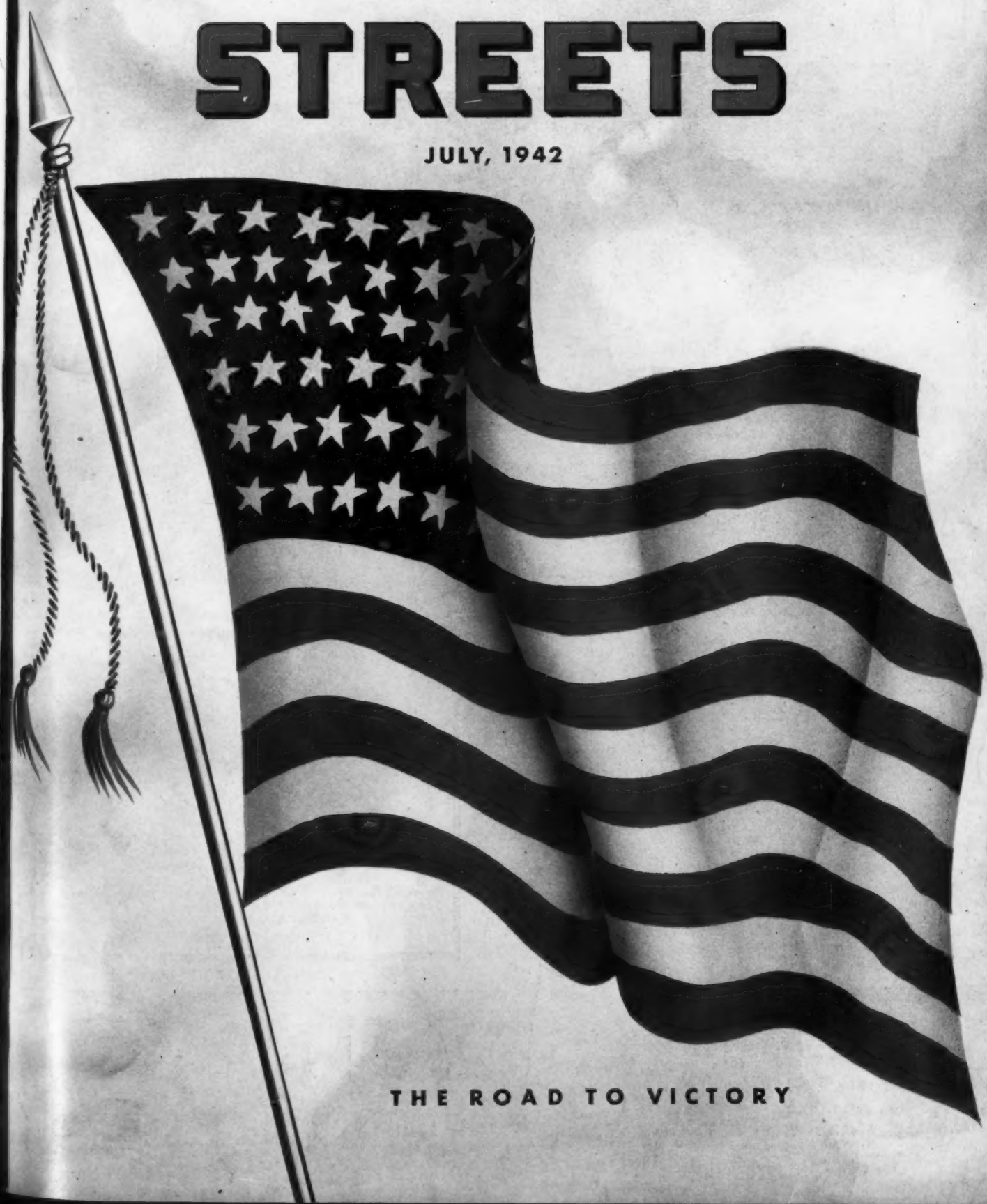
ROADS AND STREETS

JULY, 1942



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In the picture above, you see a Bethlehem Safety-Beam Guard Rail helping to assure safe transit for the U. S. Army convoy that's rolling by. This Safety-Beam makes an ideal guard rail because of its great strength, its ease of installation, and its high visibility. It's always easy to see, day or night.

Also shown are Bethlehem Steel Highway posts. Strong and readily driven, these posts, used with Safety-Beam Guard Rail, make a protective combination that's hard to beat.

Not visible in the picture, however, are other Bethlehem products that are also doing their part in speeding and protecting war-time traffic. Bethlehem Reinforcing Bars and Mats, embedded in the concrete roadway, are preventing cracks and disintegration, despite the continual heavy loads that move over the surface at high speeds. And Bethlehem Road Joints are there, too, adequately taking care of expansion and contraction of the pavement, transferring traffic loads from slab to slab, and keeping the riding surface even.

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BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY

ROADS AND STREETS

Vol. 85, No. 7 ▾ July, 1942

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Published by Gillette Publishing Co. Acceptance under the Act of June 5, 1934, authorized January 25, 1938, at Chicago, Illinois. Subscription price $3.00 per year in the United States, $3.60 per year in Canada, $4.00 per year for foreign mailing.

ROADS AND STREETS

CCA

A magazine devoted to the design, construction, maintenance and operation of highways, streets, bridges, bridge foundations and grade separations; and to the construction and maintenance of airports.

WITH ROADS AND STREETS HAVE BEEN COMBINED GOOD ROADS MAGAZINE AND ENGINEERING & CONTRACTING

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GILLETTE PUBLISHING COMPANY
330 S. Wells St., Chicago, Ill.
ESTABLISHED 1906

Publishers of

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POWERS' ROAD AND STREET CATALOG
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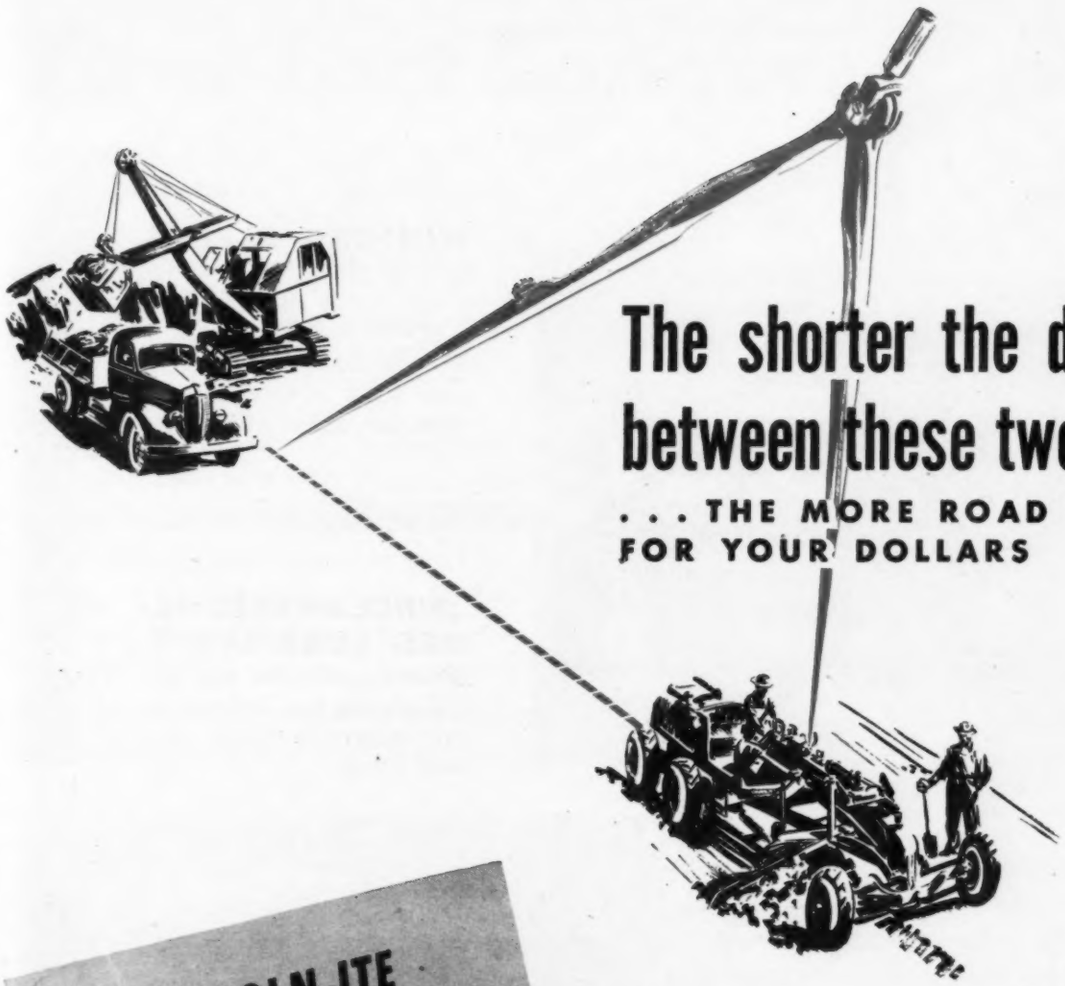

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Because there is very little unsprung weight in a Walter Truck, tires cling to the ground surface, following the contour of depressions and bumps without losing contact. For this reason, tires run cooler and with less wear and tear. This is a vital consideration to all heavy duty truck operators during the present tire shortage.

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Working on a 7920-foot round trip haul, 4 of these 150 h.p. Super C Tournapulls, with 15-yard (heaped) LP Carryalls averaged a cycle every 10 minutes on a California airport. Contractor: A. Teichert & Sons.

LOADING ROOTED ROCK on an Oregon State Highway job. By using a LeTourneau Rooter in combination with Angledozer on his pusher tractor Contractor Frank Penepacker cut Tournapull loading time and boosted yardage output.

TEAM TOURNAPULLS, D8 PUSHER, ROOTER AND MOTOR GRADER . . .

Because Tournapulls are quickly pusher loaded, haul at fast construction speeds (up to 14.3 m.p.h.) and spread their own loads, they move more yardage faster. Same time, Tournapulls conserve manpower and steel, badly needed for Victory, by eliminating such one-purpose tools as shovels and elevating graders for loading, trucks for long hauls and special spreading tools on the fill.

To get the maximum yardage from your Tournapulls, and thus speed Victory projects to earlier completion, we suggest:

"Caterpillar" D8's for Pushing

Smart contractors have found the more powerful the pusher, the quicker you get capacity loads; consequently, they use "Caterpillar" D8 tractors whenever possible.

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To get high average speed on Tournapull jobs, don't overlook the importance of well-maintained haul roads. By using a "Caterpillar" motor grader to maintain roads and keep down dust, you reduce time-eating gearshifting and operator fatigue, get less wear and tear on equipment, cut rolling resistance and reduce accident possibilities.

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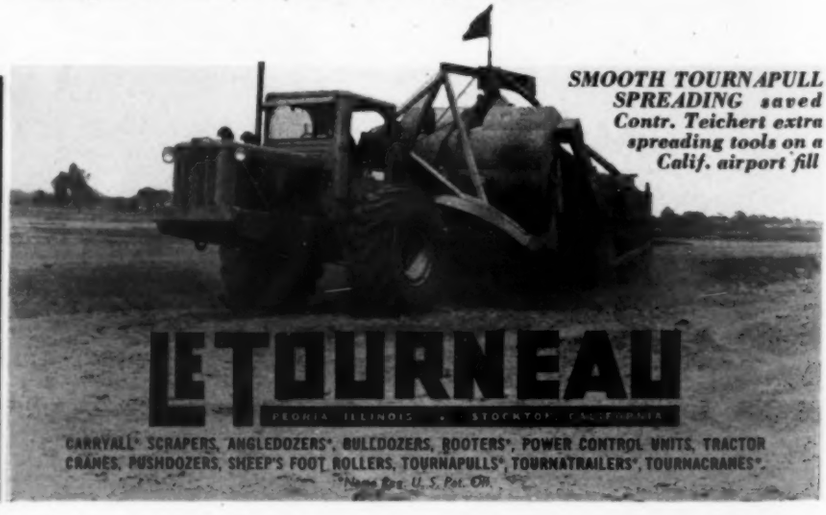
By keeping a LeTourneau Rooter hooked to your pusher tractor, for Rooting between loads, you can save blasting in many hard, rocky materials. Rooting cuts down loading time and distance, increases the yardage you can handle . . . and reduces tire wear, Tournapull and Scraper maintenance.

Your local LeTourneau-"Caterpillar" dealer can give you many more job-planning ideas to help you get maximum yardage and lowest costs with Tournapulls or tractors. To keep your equipment working at peak efficiency for victory, he's ready to serve you with genuine LeTourneau parts and factory-trained service experts. Call on him TODAY . . . and any day you have job planning and equipment maintenance problems.

Compare these victory-speeding yardages with what you get from older, conventional methods and equipment

Haul One Way	90 H.P. Model C (11 yards heaped)		150 H.P. Super C (15 yards heaped)	
	Trips	Pay Yards	Trips	Pay Yards
600	17.1	150	15.0	180
1200	14.0	119	12.0	144
1600	12.3	104	10.7	129
2000	10.9	93	9.7	116
3000	8.4	71	7.6	91
5000	5.8	50	5.4	65

These figures are based on a 60-minute hour, loading in common earth on the level with a "Caterpillar" D8 pusher and hauling over good roads



SMOOTH TOURNAPULL SPREADING saved Contr. Teichert extra spreading tools on a Calif. airport fill

LETOURNEAU

PEORIA ILLINOIS • STOCKTON, CALIFORNIA

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*Name Reg. U. S. Pat. Off.

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Best of all, these ideal pavement bases are in themselves capable of carrying heavy traffic with fairly high count so that if paving is postponed or suspended the community has the advantage of the finest low-cost roads available per dollar of cost.

Stabilized surfaces save tires, blades and gasoline, too, because they require only one blading against ten or twelve for an unbound surface. During the period of labor and material shortages surface consolidation offers a method of providing excellent secondary roads and pavement bases at a very low cost.

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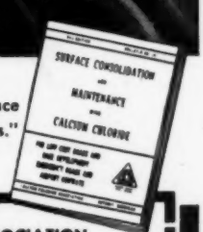
Send coupon for new book, just off the press, "Surface Consolidation and Maintenance of Unpaved Roads."



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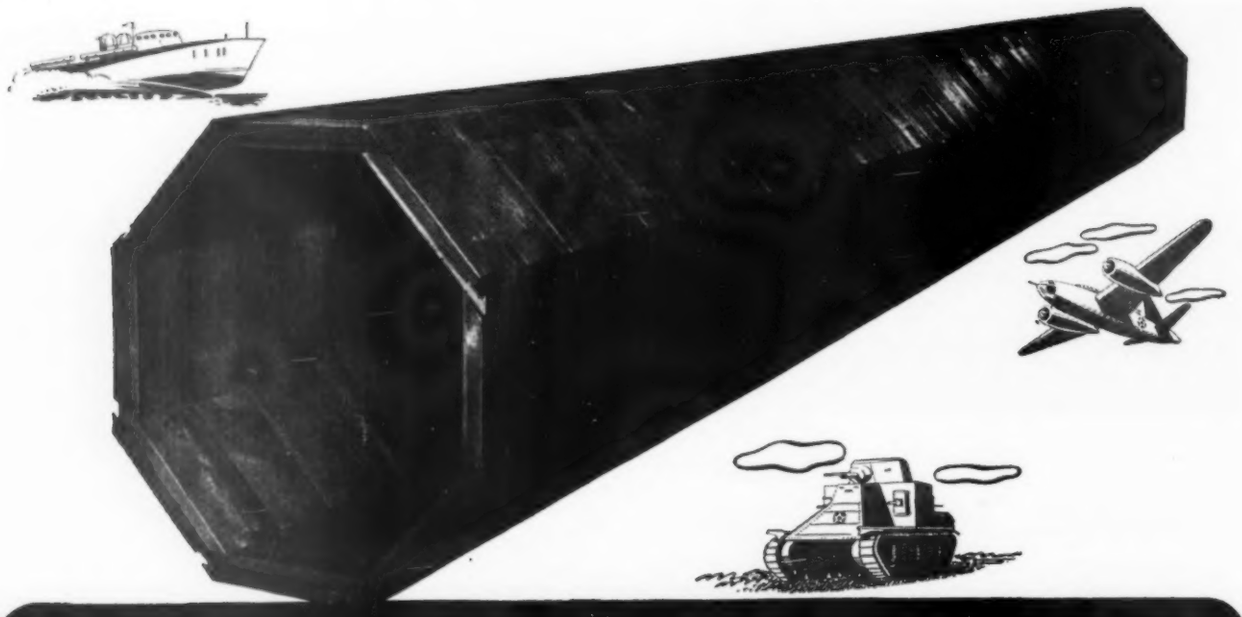


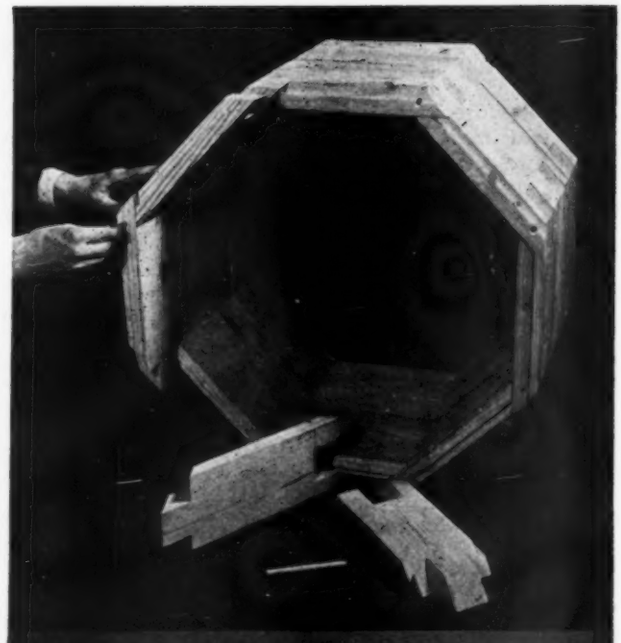
This New Drainage Pipe SAVES METAL FOR WAR!

Steel, a critical war material, must not be used in any drainage structure except where engineering integrity demands it. Yet here is a practical war-time substitute. It's the new ARMCO Emergency Pipe, designed by a drainage engineering organization with 38 years' experience.

This completely new design in wood drainage structures meets war-time emergency requirements. Steel bands, metal reinforcing or other critical materials are not required. The semi-flexible design provides ample strength to meet engineering standards. Yet Emergency Pipe is light in weight for easy handling. Installation cost is low. There is no field assembly except joining long sections of any length that can be hauled and handled. Skilled labor is not needed.

On the durability side, ARMCO Emergency Pipe performs admirably as a war-time structure. It goes "all-out" in meeting the War Production Board's requirements for substituting non-critical materials wherever possible.

Use the ARMCO Emergency Pipe for culverts, storm sewers, underpasses, conduits—or wherever else drainage structures are needed and vital materials must be conserved. Your request will bring full data. Armco Drainage Products Assn., 545 Curtis St., Middletown, O.



The patented Emergency Pipe design utilizes short wood sections to impart beam strength and wood dowels to eliminate nails.

ARMCO

ARMCO EMERGENCY PIPE

TWIN-RIBBON Concrete Spreading

Koehring Paver stability permits practically right angle pouring. Bucket can travel to end of boom for maximum spreading area.

Double-Quick Dumping and Spreading

Koehring Pavers, Twinbatch and Unibatch, have the special fast spreading Twin-Door boom bucket. Twin doors, both opening same direction, provide Double-Quick Dumping and Spreading. Twin ribbons of concrete are spread on the grade. Action is instantaneous . . . large Twin-door opening is approximately 13 square feet. Full width of bottom is used for door opening. No choking at bucket doors with dry or harsh concrete. Bucket shaking is not necessary. Seconds saved when dumping and spreading cut batch cycle time.

KOEHRING COMPANY, *Milwaukee, Wisconsin*

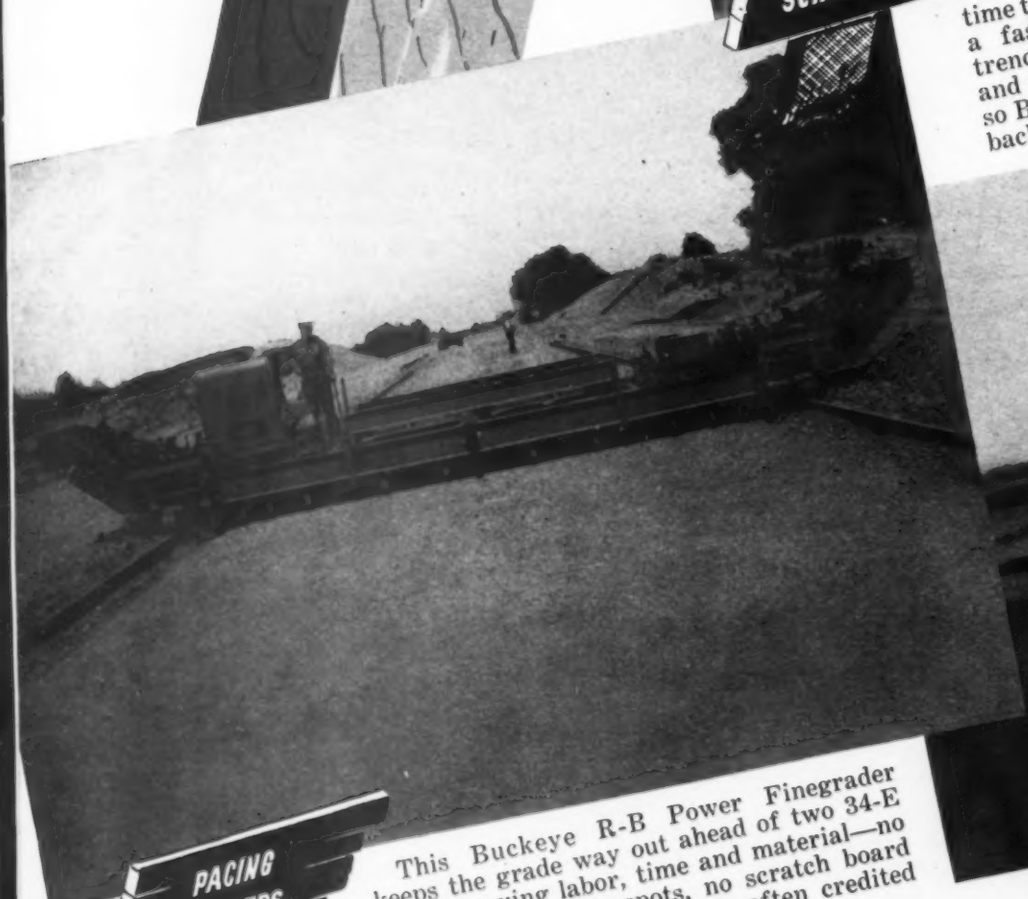
KOEHRING HEAVY DUTY

HEAVY-DUTY CONSTRUCTION EQUIPMENT

the way to BEAT THE PROMISE!

DAYS AHEAD OF SCHEDULE

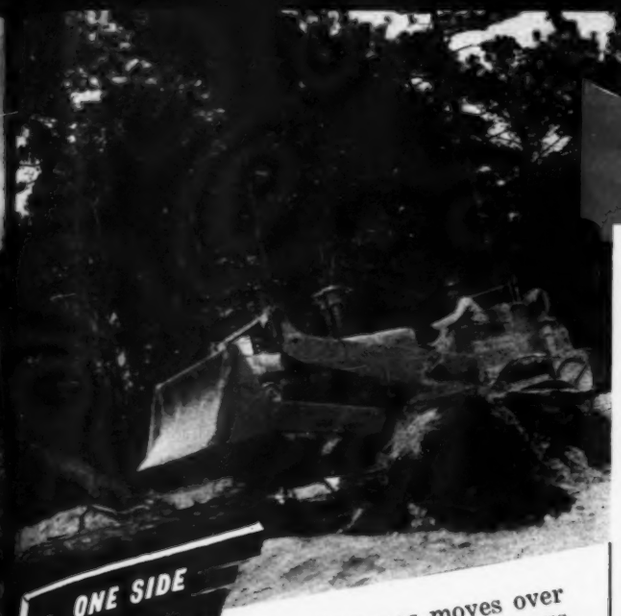
Army engineers figured close. No time to lose at this far flung outpost. But, a fast, compact Buckeye "410" dug trench for air field drainage, sewerage and water *beating the promise* by days, so Buckeye Bulldozers could move in for backfilling, spreading and leveling.



PACING 2 PAVERS AT ARMY POST

This Buckeye R-B Power Finegrader keeps the grade way out ahead of two 34-E pavers, saving labor, time and material—no high spots, no low spots, no scratch board needed. These machines are often credited with 100 ft. of 24 foot grade per hour.

RUNWAYS RUSH!



IT'S dig, dig, dig—day and night at top speed to beat the promise and smash the Axis the fastest. And America has the men and the machines and the will to do it!

Buckeye is proud to contribute to the Victory with its broad line of earth moving and road and runway building equipment that is smashing records on war construction jobs everywhere.

Watch Buckeyes work and you'll know they're the machines you need now—and after the war. Talk it over with your Buckeye dealer or write direct today.

THE BUCKEYE TRACTION DITCHER CO.
Findlay, Ohio

ONE SIDE FOR AN ARMY CAMP!

The wilderness moves over when Buckeye Cable Dozers and Power Control Units move in. They grade and level, uproot trees, backfill trenches, clear underbrush, tow and hoist machinery—do 1001 jobs. The Army owns hundreds of them, too!

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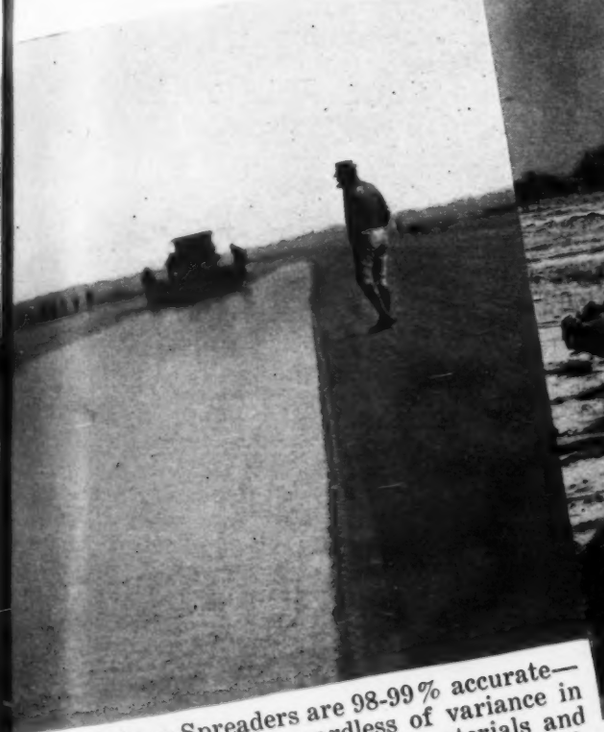
PART OF THE ARSENAL OF DEMOCRACY



Buckeye Spreaders are 98-99% accurate—spread accurately regardless of variance in truck speed, save manpower, materials and time. Natural choice for this high speed military runway construction, they'll handle all kinds of jobs and all kinds of materials.

PULLING BOMBS FROM UNCLE SAM'S HAT!

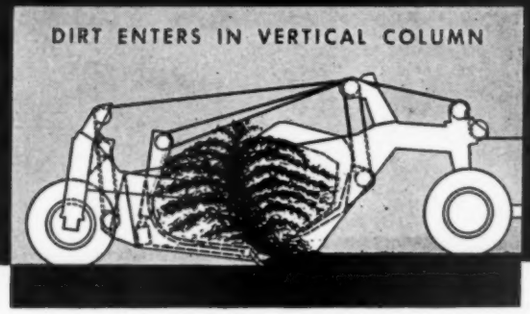
Buckeye Clipper Convertible Shovels and Trench Hoes helped turn 100,000 acres of corn fields into powder and shell loading plants, from "snowfall to thaw." When they said it couldn't be done, they didn't know Clipper's Vacuum Control is undaunted by any weather and that seconds saved in each cycle means greater yardage. One of Clippers many war jobs!

Built by Buckeye

THE DIRT "BOILS"

FOR FAST LOADING

Bucyrus-Erie 4 WHEEL SCRAPERS



This diagram of the "boiling" action shows how the dirt flows evenly into both apron and bowl by the shortest possible route.

Bucyrus-Erie Scrapers load fast and in short distances because the cutting edge is double-curved (curved both vertically and horizontally) to "boil" the dirt up easily into both apron and bowl.

The **vertical curve** "curves" the dirt upward, just as the moldboard on a plow does. The dirt, entering in a vertical column, rises up through the load until it rolls out on top. Thus, you get maximum effectiveness from tractor power, because the last dirt entering the scraper doesn't have to push and pack the whole load in order to get in.

The **horizontal curve,** like the round point on a hand shovel, makes penetration easy and rolls the dirt inward toward the center of the bowl. This "rolling inward" action provides easy loading by reducing sidewall friction.

This two-way rolling action breaks up the dirt as it enters the bowl so that the scraper fills evenly with minimum voids, to give heaping payloads every time. The broken up dirt also rolls out easily for fast, free-flowing ejection. — BUCYRUS-ERIE COMPANY, South Milwaukee, Wisconsin.

BUCYRUS ERIE TRACTOR EQUIPMENT

SEE YOUR INTERNATIONAL TRACTRACTOR DISTRIBUTOR

"With GULF LUBRICANTS we get long low-cost service from our equipment"

Says contractor on mountain highway job.

"Proper lubrication helps us avoid excessive wear and serious mechanical troubles"

"WITH new equipment and repair parts hard to get, more than ever we rely on proper lubrication with Gulf oils and greases," says highway contractor. "Gulf lubricants provide the kind of protection that enables us to secure long, low-cost service from every unit."

Good lubrication—always a necessity for the satisfactory operation of contractors' equipment—today is a vital requirement for the successful completion of tough jobs on schedule. For new units are increasingly hard to get even with high priorities. Breakdowns can well be a serious matter.

So play safe on your next job—ask a Gulf engineer to recommend the right lubricants for each piece of equipment you are using. His recommendations are based on broad experience and knowledge gained through daily contacts with contractors' problems in the field.

Gulf quality lubricants and fuels are quickly available to you through more than 1200 warehouses located in 30 states from Maine to New Mexico. Write or 'phone your nearest Gulf office today.

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REG. U.S. PAT. OFF.

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OIL IS AMMUNITION . . . USE IT WISELY!

Posts can be part of the scenery . . .

just use PRESSURE-TREATED WOOD

Difficulties and delays in obtaining materials frequently tie up the completion of projects started 'before the war.'

Many municipalties have successfully solved the problem by the use of pressure-creosoted wood.

Pressure-creosoted wood lamp standards, sign posts, fencing, etc., eliminate drain on the supply of critical metals. Furthermore, they blend perfectly with the surroundings, in landscaped areas, rustic settings, parks and parkways.

Not only is the first cost less than with other permanent materials, but maintenance is extremely low. Pressure-creosoting gives a pleasing, weathered effect, which becomes more attractive with age. The deep penetration of preservative obtained with proper pressure-treatment gives many years of defense against decay and insect attack, without periodical painting.

We are equipped to frame fabricated parts before treatment, to your specification. Necessary assembly can be easily done on the job, with local labor.

If you have a post, fencing or other similar problem, and will write us, we will be glad to give you our recommendations for a solution.

WOOD PRESERVING DIVISION
KOPPERS COMPANY
PITTSBURGH • PENNSYLVANIA

use **KOPPERS** *products*

ROADS AND STREETS

July, 1942, Vol. 85, No. 7

California Coast Road Project

By ARCH WALSH

Resident Engineer, Division of Highways, California Department of Public Works

THE highly important state highway project between Watsonville and Rob Roy Junction in Santa Cruz County was undertaken to relieve bad traffic congestion and to reduce the high accident frequency on the existing narrow county road, built many years ago and later taken into the State Highway System. It had exceedingly bad alignment and innumerable sight restrictions.

The First Contract

In December, 1940, the initial grading contract was let to N. M. Ball Sons of Berkeley, Calif., for grading and placing of structures on 6.2 miles of this section connecting with the city of Watsonville, near its easterly boundary.

This first contract consisted in general of constructing a 47 ft. graded roadbed sufficient for a 3-lane pavement and 7 ft. shoulders where sight distance was adequate; but the roadway was widened to a 64 ft. width on summits where sight distance was limited to provide for a 4-lane pavement.

The new highway location lies between the present road and the coast line and crosses several old tidal channels which have filled up with alluvial waste and vegetable matter, thus forming typical peat bogs. The peat formation ranges from 10 ft. to 43 ft. in depth, and due to its semi-liquid condition presented a difficult foundation problem, as rather heavy embankments were planned at each of these locations.

Fill Construction Over Peat Bogs

Special foundation treatment was believed desirable to support the superimposed loads, and extensive test borings were made to determine the character and depth of the peat formation. It was decided to stabilize the foundation at Harkins and Watsonville Sloughs by constructing vertical sand drains to facilitate the escape of excess water as pressure was applied to the surface by placing the fill. These drains were constructed by drilling wells 20 in. in diameter through the peat formation, varying in depth from 10 to 43 ft., spaced on 13 ft. centers parallel to the center line and on 11 ft. centers at right angles to the center line. This drilling was done by means of rotary well drilling machines.

To insure the wells being free of sediment before backfilling, clear water was injected into the wells and removed by means of a suction pump, which carried away the silt and sediment. This process was continued until the water ran clear, after which the wells were backfilled with clean, graded sand.

A 3 ft. sand blanket was placed over the entire area to provide a drainage outlet from the sand drains.

D8 Caterpillar depositing material for berm

Section of uncompleted grade at north end of job

Spreading top soil with D8 Caterpillars on 1½:1 cut slopes

Cutting 1½:1 slopes with D8 Caterpillar

Determining Fill Settlement

To determine the rate of settlement and side pressure being developed by placing the fills, and the safe rate at which the load could be placed, pressure gauges connected with well points placed at the bottom of the peat formation were located at the sides of the fills, and settlement platforms were installed at intervals beneath the fills. From these platforms 1-in. pipe was extended vertically as the fills were constructed and level readings taken thereon to determine the rate of settlement. From this datum the rate at which the fill could be placed without causing undesirable heaving of the foundation material was determined.

In general, it was found the fill could be placed at a rate of 1 ft. of depth in 24 hours without the pressure gauges exceeding a pressure of 7 lb. per square inch. This pressure was found to be the maximum allowable if displacement of foundation material was to be avoided.

Some 85,000 cu. yd. of material was placed at Harkins Slough and 77,000 cu. yd. were placed at Watsonville Slough. At this latter location, some heaving of the areas adjacent to the fill occurred due to the excessive depth of peat.

At several other slough crossings the fills were made by overloading of the foundation, the weight of the superimposed fill displacing the peat and forcing it beyond the fill slopes. The largest of the fills placed in this manner was at Struve Slough, the fill being 35 ft. above the original surface and depth of peat being 35 ft. This fill amounted to 258,000 cu. yd. Of this amount 174,000 cu. yd. was in subsidence, below the original surface. Extensive heaving occurred in the areas adjacent to this fill.

Results secured from these alternate methods of hastening settlement and ultimate stabilization of the roadway will be valuable in future construction of this nature.

The northwesterly section of the new location is through rolling hills with vistas of the coast line and Monterey Bay in the distance and will unquestionably develop as potential home sites.

Throughout the project the cut slopes have been flattened to 1½:1 and covered with 6 in. of top soil sown with grass seed to retard erosion.

Major Contract Items

Some of the major contract items on this contract were as follows:

Roadway excavation .... 1,395,000 cu. yd.
Overhaul .....10,645,000 cu. yd.

Corrugated metal pipe..	6,436 lin.ft.
Excavating vertical sand drains	15,043 lin.ft.
Portland cement concrete (Structures)	560 cu. yd.
Reinforcing Steel	100,000 lb.

Total Contract Cost—$287,689

The project was financed from both state and federal highway funds, it being a Federal Aid Project.

Approach roads were held at a minimum and are restricted to locations consistent with safety.

Construction Equipment

The grading was done by means of 7 28-cu. yd. Carryalls powered with Caterpillar D8 tractors, 3 12-cu. yd. Tournapulls and 1 14-cu. yd. Euclid.

The terrain, which the road traverses, contains many springs and seepage planes which were treated by constructing trenches through the water-bearing strata and backfilling with drain rock. A slide area from which 70,000 cu. yd. had to be removed was further stabilized by means of hydro-auger drains, which will be discussed later in this article.

The contract was operated on a 2-shift basis and was completed, with the exception of Watsonville Slough fill, on January 23, 1942. M. L. Simpson was the superintendent on the job; L. L. Wigell was office manager; and W. D. Sorenson was the master mechanic.

The Second Contract

Upon completion of the major contract items on the Ball Contract, a second contract was let on Oct. 30, 1941, to Parish Brothers of Sacramento, for grading 1.56 miles from the end of the previous contract to Rob Roy Junction and placing 9 in. of crusher run base and prime coat over both contracts, from Watsonville to Rob Roy Junction, a distance of 7.75 miles.

Grading is completed on this contract and surfacing is in progress (on April 15). Major contract items are as follows:

Roadway excavation	477,000 cu. yd.
Overhaul	2,608,000 sta. yd.
Crusher run base.....	95,500 tons
Liquid asphalt	1,000 tons
6" Perforated metal pipe (Underdrains)	10,000 lin. ft.
Reinforced concrete pipe.	2,264 lin. ft.
Galvanized metal pipe (surface drain)	13,100 lin. ft.

Total anticipated cost is $367,181

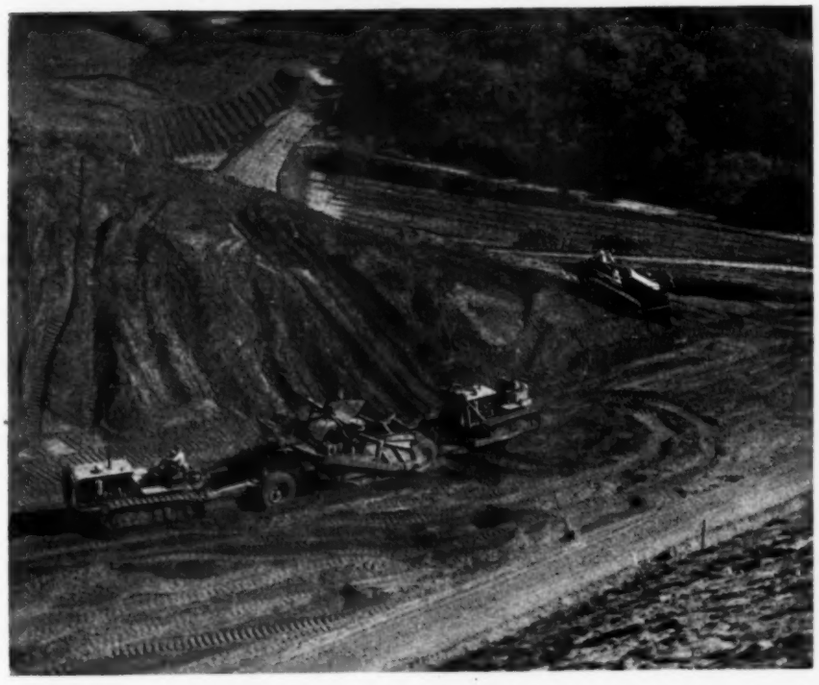
Grading was done a 3-shift basis.

Equipment consisted of 9 Caterpillar D8 tractors, five 28-cu. yd. Woolridge Carryalls, and three 12-cu. yd. Tournapulls.

The job was illuminated for night operation by 1500-watt portable Kohler light plants and flood lights.

Since the entire job had to be protected from erosion due to winter

Shaping subgrade with D8 Caterpillar dozer and carryall



D8 Caterpillar pulling 28-cu. yd. scraper and D8 pusher Caterpillar completing rough grade

D8 Caterpillars with 28-cu. yd. carryalls hauling shoulder material on rough grade

D8 Caterpillar and 28-cu. yd. carryalls completing 200,000 cu. yd. fill

storms it was decided to oil the berms constructed on the shoulder of embankments. SC-2 liquid asphalt was used, applied at the rate of 0.5 gal. per square yard. This treatment efficiently controlled the erosion from the berms.

Crushed Rock Surfacing

Preliminary to placing the 9-in. crusher run surfacing, shoulder material which is to be bituminous treated was placed and compacted and cut by blades to conform with the edge of the surfacing.

The surfacing, which is in progress (on April 15, when this article was written), is hauled from cars at Watsonville or from the quarry of the Granite Rock Co. at Logan in trucks. Because of the sandy nature of the 1 ft. of selected material which was placed on the subgrade, difficulty was expected in pulling spreader boxes by truck. Accordingly, a spreader box has been equipped with skids and bolted to the bulldozer of a Caterpillar D7 tractor which pushes the box.

Equipment Used in Surfacing

Equipment used in surfacing operations consists of:

2—Caterpillar No. 12 motor patrols
1—Caterpillar No. 10 motor patrol
1—Adams 112 motor patrol
1—Buffalo Springfield 12-ton roller
1—Galion 10-ton roller
1—Galion 10-ton tandem roller
1—D7 Caterpillar with bulldozer spreader box
1—⅜ cu. yd. Lorain clamshell
18—Rock trucks, various sizes and makes.

Completing 200,000 cu. yd. fill on Parish contract

It is anticipated the present contract will be completed by June 15th of this year.

The contractors' personnel on the job is as follows: Harold Parish, general superintendent; Max Parish, grading superintendent; Lawrence Carrol, office manager; and Paul LuKasco, master mechanic.

The State's personnel on the job is as follows: A. Walsh, resident engineer; Chas. T. Ledden, general assistant; Walter Nilsson, office man; Warren Samarzich, concrete assistant; and J. E. Bennett and E. E. Hazlewood, chiefs of party.

Hydro Auger Work Drainage At Slide Area

This slide consisted of a fine, sandy loam overlying a clay strata which is lubricated by underground seepage. During the construction of the N. M. Ball Sons' Contract, approximately 70,000 cu. yd. were removed from the

Supt. Max Parish

area and the cuts sloped back on 2½:1 slopes. Since sliding continued it was decided to drain the underground seepage by means of 2-in. perforated pipe jetted back into the slide area. Water was supplied under pressure by a pump which furnished water for the jetting and also for a water motor which revolved a pipe with a cutting bit which was jacked back into the slide for distances up to 100 ft. These pipes were placed at locations where seepage appeared on the face of the slide and extended back until the underlying clay strata was contacted, the water being picked up through the perforations in the pipe.

Considerable seepage was intercepted in this manner, thus tending to stabilize the slide. Roadway culverts in this area were placed on a 7 percent grade in order to carry the mud and silt laden storm water which

Grading Inspector Stewart and Superintendent Max Parish

Grading Foreman W. Shields, Grading Inspector Stewart and Supt. Max Parish

is characteristic of this locality where the soils are highly erodable.

This work was done at a cost of $2,500.

Erosion Control

Because of the light, sandy nature of the material on the northerly six miles of the project, it was considered necessary, in order to prevent excessive erosion of the cut and fill slopes, to supplement the treatment given the cut slopes on the Ball Contract and also to extend this work to the fill slopes.

A blanket of straw was placed over the slopes and punched into the loose material with spades in order to prevent it from being blown or washed away. Following this, the slopes were re-seeded where necessary with Western rye grass.

In locations on cut slopes where seepage appears, baccharis plants and willows have been planted. As a result of the above treatments the erosion has been greatly reduced.

Associated Equipment Distributors Meet in Chicago

The 23rd semi-annual meeting of the Associated Equipment Distribution was held June 8-10 at the Edgewater Beach Hotel, Chicago, Ill., The convention was attended by the largest number of registrants in the history of the association — 672. Two members came from Canada and one from Mexico. All sessions were presided over by T. W. Harron, President, of San Francisco, Calif. Ed. P. Phillips, 1st Vice-President, of Richmond, Va., was program chairman. The meeting was addressed by officials of the War Production Board, Office of Price Administration, Army, Navy and a Congressman.

The construction equipment men were told by H. O. Penn, Chief of the WPB's Used Construction Machinery Section that plans for a comprehensive nation-wide inventory of all construction and industrial equipment owned by non-military government agencies, which might be of use in the war program, were under way. Mr. Penn pointed out that the rebuilding and repairing of this machinery would be handled by distributors in the field in order to take advantage of their facilities for this purpose and to help them stay in business despite the fact that war conversion has left them with practically no new machinery to sell. "Proper and equitable distribution of machinery for repair and rebuilding will be effected through the regional WPB offices. There had been some talk of the government building its own plants for this work, but the new program of working through dealers eliminates that," stated Mr. Penn.

Walter Shoemaker, Chief of the Construction and Extraction Equipment Section of the OPA, stated, in a talk before the convention, dealers in construction machinery will not be required to submit price lists under the new OPA ceilings, provided they identify a manufacturers list they are using.

Major Robert L. Richardson of the Army Engineers Corps told the equipment men that they could aid the war effort by extending their facilities to maintain construction equipment needed by the armed forces. He said this would eliminate the necessity of building large repair depots.

Representative Dave E. Setterfield, Jr., 3rd District, Virginia, spoke to the distributors and manufacturers and told them that it was up to business and professional men to aid Congress in curbing bureaucracy. He declared business is harassed by a "tidal wave" of orders, regulations and administrative rulings and questionnaires. He warned that bureaucracy is one of the most serious threats to our way of life. Among the other speakers were Joseph F. Ryan, Chief of the Construction Machinery Branch, WPB, Herbert Foreman, Managing Director, Associated General Contractors of America, and Rufus G. Poole, formerly Associate General Counsel of the Department of Labor.

The guest speaker of the Manufacturers Day luncheon on June 8 was Arthur H. Motley, Vice-President of Crowell Collier Publishing Co.

The Superintending Civil Engineer of the Navy located in Chicago, Captain Henry G. Taylor, U. S. N., addressed the convention and gave a brief outline of the Navy and the functions of the Bureau of Yards and Docks and its relation to construction machinery. Captain Taylor stated the Bureau of Yards and Docks has been divided into certain sections to handle aviation facilities, ordinance, submarine bases, and advance bases, with construction and ship repair facilities. He pointed out the Navy must have equipment in the construction of these facilities and that Officers in Charge of Construction have full authority after a project has been started to carry the job through to completion. Captain Taylor also stated that the Bureau of Yards and Docks has delegated more authority to the field officers and that Superintending Civil Engineers, composed of high ranking engineer officers, had been placed in charge of seven Areas.

A. G. Bryant, President, Bryant Machinery and Engineering Co., Chicago, addressed the distributors during the third session and related experiences of the machine tool distributors in the war effort and called attention to the close relationship to construction machinery distributors.

The following AED members addressed the convention:

James L. Nellis, Memphis, Tenn.
James C. Alban, Baltimore, Md.
Eldon M. Farnum, St. Louis, Mo.
G. W. Van Keppel, Kansas City, Mo.
W. G. Morgan, St. Louis, Mo.
Victor L. Phillips, Kansas City, Mo.
Harry Teal, Richmond, Va.
William A. Danner, Boston, Mass.
Morton R. Hunter, Milwaukee, Wis.

J. L. McCaffrey, Vice-President, Forest Siefkin, General Attorney, and M. F. Peckels, all of the International Harvester Co.; John Munro of the Travelers Insurance Co., and R. W. Digges, Special Assistant to the Administrator, Federal Works Agency, also delivered papers on subjects pertinent to the industry.

A Maryland Access Road Project

By AUSTIN F. SHURE
Assistant to Chief Engineer
Maryland State Roads Commission

ONE of the first military access highways to be placed under construction in Maryland is the section leading into Ft. Meade from the Baltimore-Washington Road, Route No. 1—a distance of 3.977 miles.

The necessity for the improvement originated with the demand for the elimination of a railroad crossing at grade over the Baltimore-Washington Branch of the Baltimore & Ohio RR in Jessup. With the advent of the emergency and the development of the Army Post at Ft. Meade, which now occupies an area of some 13,500 acres and with a possible population of some 20,000 to 30,000 (DMF) men, the original road leading from the Post to Route No. 1, a part of which was a narrow and circuitous county highway, carrying a daily traffic not in excess of 250, sudd nly became overcrowded with the daily movement of some 1300 vehicles.

General Features of Projects

With the necessity for development becoming so obvious, the State Roads Commission, without waiting for the passage of any access road legislation in Congress, proceeded with the improvement of the entire link. As a result, the first project between Route No. 1 and Jessup was awarded on June 10, 1941. The project was completed on Oct. 3, 1941. This project has a length of 1.256 miles and was built with State and Federal Aid Secondary funds participating on the basis of a 50-50 proposition. The contract price was $102,235.

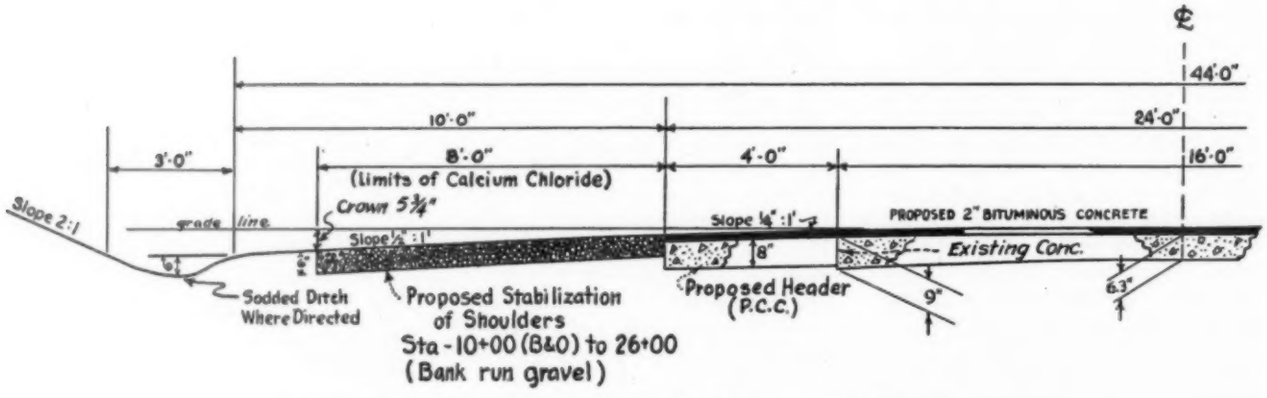
The second project involves the Railroad grade separation structure at Jessup, including the approaches thereto. It was awarded on Sept. 3, 1941. The project has a total length of .568 miles. It would normally have been a 100 per cent Federal grant, as advantage was taken of the Federal Aid grade secondary funds, but such Federal funds were available only to the extent of some 15 per cent of the contract price of $171,404. As a result, the State Roads Commission financed the project.

The third project involves the widening of an existing state highway constructed in former years between Jessup and Ft. Meade, and the relocating of existing objectionable alignment. The section has a length of 2.153 miles and is being constructed as a W.P.A. project, sponsored by the State Roads Commission, the total estimated cost of the improvement to be $137,629, of which $108,754 is the W.P.A. contribution and the remainder is financed by the State Roads Commission. This work was started Dec. 15, 1941.

It might be stated in connection with the financing of these projects that prior to any Federal legislation through which provisions have been made for the financing of access roads, conferences were held with the commanding officers of the several army and navy posts throughout the state, at which time preference ratings were established for the several routes of access with such posts, and this particular route was given high priority rating as a means of access to Ft. Meade. As a result, in the financing of future certified access road projects, credit for such prior financing by the State Roads Commission is expected.

Design Feature of First Project

In the design of the first project, special attention was given to the channelization which would permit the blending of some 1300 vehicles moving to and from the army post into the 4-lane Baltimore-Washington Road carrying a normal daily traffic of 17,000 vehicles, and a peak movement of 24,000 over week-ends. This was done by the separation of the north and south drives of the Baltimore-Washington Road at the point of intersection; thereby developing a dual type of improvement. Thus, by the construction of a median strip or parkway, provisions were made for the left turn movement at the intersection. This is further controlled by traffic light installation. All right-turn movements are taken care of by special lanes and by the construction of accelerating and decelerating areas.



Cross section for 2-in. bituminous concrete surface on existing concrete

Baltimore Grade Separation Structure

The Railroad grade separation structure on the second project, while not unusual in type, was designed in complete coordination with the design of the highway. The structure is a 3-span steel I-beam bridge with metal railing. The floor system will be supported by reinforced concrete piers, and these piers are supported by cast-in-place concrete piles. The bridge and its approaches are to be constructed on a 2-degree curve, and the pavement on both bridge and the approaches is to be super-elevated to make provision for a highway vehicle speed of 60 miles an hour.

Pavement Widening on Third Project

The third project is being improved by the use of a concrete header or base placed adjacent to the existing concrete surfacing, bringing the width of the paving from 16 ft. up to 24 ft. An asphaltic concrete is then used for wearing surface and for the full width of the pavement. Asphaltic concrete, while not unusual in its characteristics, is a type of pavement which has been used rather extensively throughout the several sections of the state where the local materials are available in such quantities as to justify the installation of hot-mix plants. The local sand and gravel is used in regulating proportions, and the practice in using this material for widening, even without the additional base course, is very common throughout the state and particularly on the eastern shore of Maryland.

Specifications for Asphaltic Concrete

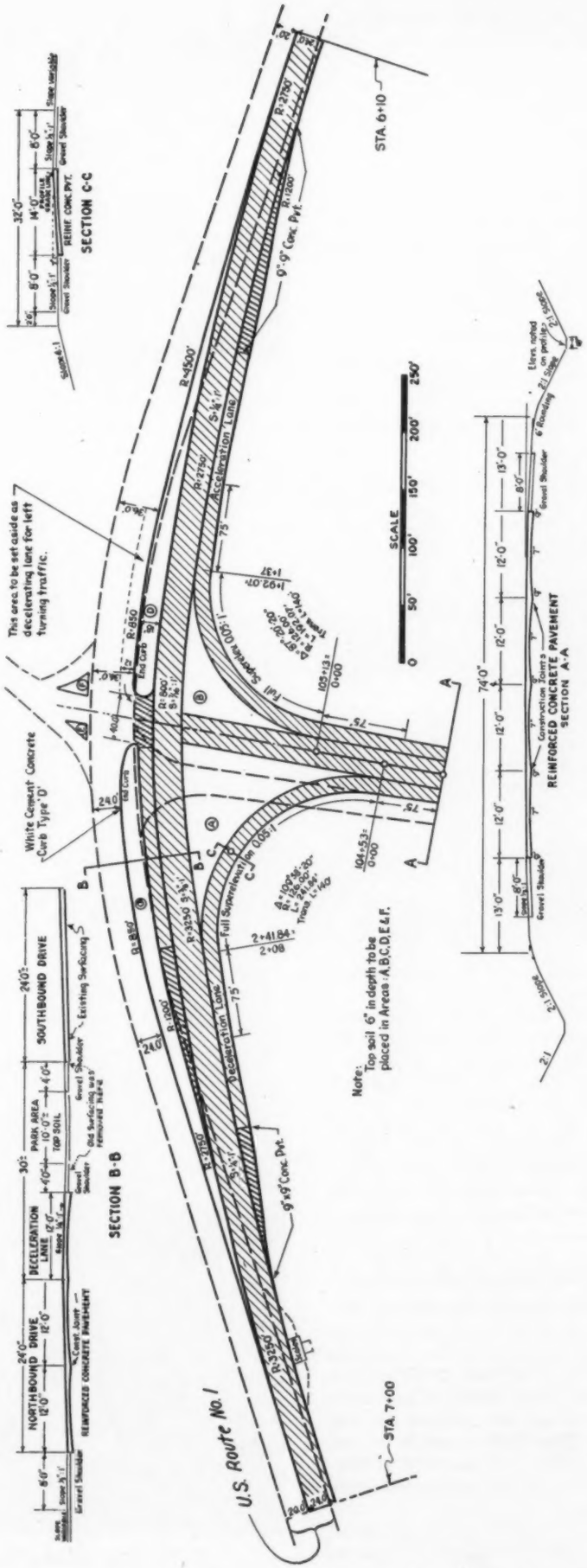
On this particular project, the State Roads Commission specifications for "Specification 'B', Bituminous Surface Course," (Fed. Spec. I-1) are followed to meet the local materials supply, with the following revisions:

This asphaltic concrete consists of mineral aggregates and Maryland "A" 85/100 penetration asphalt. The mineral aggregates of this asphaltic concrete mixture is graded to meet the limit set forth below.

One ton mixture shall consist approximately as follows:

Passing 1½ in.	
Retained on No. 4—	555 Lb. Fine Gravel
Passing No. 4	—1315 Lb. Selected Course Bank Run Gravel
	130 Lb. Asphaltic Content
	2000 Lbs.—Total

Temperature of mixture does not exceed 275° F.



Intersection showing method of blending the 1300 vehicle traffic from Army Post into the 4-lane Baltimore-Washington Road carrying 17,000 vehicles daily

The gradation of the aggregates entering into the mixture is the following:

Passing—1¼	in. Screen	100.0%
1	in.	95.0%-100.0%
½	in.	80.0%- 90.0%
No. 4		70.0%- 80.0%
No. 10		55.0%- 65.0%
No. 40		17.0%- 35.0%
No. 80		5.0%- 9.0%
No. 200		2.0%- 6.0%

A tolerance is permitted of not to exceed 5 lb. of bituminous binder per ton of aggregate above or below the calculated required amount.

Job Gradings

Within the above master grading requirements for each type of mixture, the grading of the job material furnished is held to such uniformity that the fractions of aggregate passing the numbers 4, 10 and 200 sieves will remain constant throughout any one 8-hour "run," within the average percent of the "run."

Material passing No. 4 sieve ± 5%
Material passing No. 10 sieve ± 5%
Material passing No. 250 sieve ± 2%

Samples taken from the plant are tested for conformity with these requirements.

24 Ft. Width Adopted

The State Roads Commission has, in conformity with the geometrics of design, as adopted by the American Association of Highway Officials, used a 24-ft. standard width of pavement throughout all the projects on this highway. The width is ample for the existing traffic flow and will accommodate all probable increases in army maneuvers.

The topography is not rough, so all of the modern requirements as to grade and alignment have been complied with without excessive cost.

New road in Ft. Meade, connecting link with Baltimore-Washington Road

Entrance from Ft. Meade Project in Route 1

Sub-Base Construction

The rigid type of pavement has been used most extensively throughout Maryland, and in recent years much study has been given the characteristics of soils, which has led to a very extensive use of sub-base materials. On this particular project the soils encountered have a high bearing value—such soils as those classified by the Public Roads Administration as A-2 and A-3. Sub-base was required only where the inferior clay soils, having a possible classification of A-7, were encountered. Concrete surfacing was adopted and on the new work following the Maryland practice it was constructed in two 12-ft. lanes.

The typical section of each 12-ft. lane has a surface slope of some ⅛ in. to the foot and a thickness of

The widening along the existing concrete surface

Entrance not principal relocation

These projects were designed and are being constructed under the direction of the State Roads Commission, Wilson T. Ballard, Chief Engineer. All of the construction work by contract is under the direct supervision of E. G. Duncan, District Engineer at Laurel, Md., and the W.P.A. Project is under the direct supervision of Arra Chaney, Junior Assistant Highway Engineer of Baltimore.

M. J. Grove Lime Co., of Lime Kiln, Maryland, and Ehrhart & May, of Baltimore, are the contractors.

9" on each edge and 7" in the center. Each 12-ft. lane is reinforced with a mesh having a weight of some 59 lb. per 100 sq. ft.

Contraction and expansion joints are being used at intervals of 40 ft. and 120 ft., respectively. ⅝-in. deformed tie bars, spaced on 4 ft. centers, are used between the 12 ft. construction lanes, and low transfer devices are used at all contraction, expansion and construction joints.

Bank-run gravel is used for shoulder stabilization for widths of 8 ft. along the outside edge of the concrete surface, which is treated with calcium chloride. After the highway is opened to traffic for a period of time and the gravel shoulders have become throughly compacted, they

The completed project

Partly completed Baltimore & Ohio R. R. grade separation structure

are treated with a bituminous material. Recent contracts in Maryland have included that phase of the work which relates to roadside development, and the contracts for this highway include such items as sodding, seeding and mulching.

There are no unusual construction problems involved. The contractors have been and are well aware of the urgency of the construction and progress has been very satisfactory. Traffic is maintained continuously, even though other means of access are available. Outstanding is the fact that this Maryland access highway, modern in every respect and costing no more than similar work under normal conditions, is being completed well in advance of other highways of its classification, in ample time to meet the needs of the Army.

Concrete Pipe Lines

A most complete and useful book on concrete pipe lines has just been published by the American Concrete Pipe Association. While intended primarily as promotional literature the publication is really a handbook on concrete pipe and its uses, and an engineering text on hydraulics and sanitary engineering design.

The book was compiled and edited by M. W. Loving, Assoc. M. Am. Soc. C. E., a sanitary engineer of many years service as secretary of the American Concrete Pipe Association.

The book contains 301 pages and is bound in simulated red morocco. It is profusely illustrated with engineering charts, diagrams and photographs of applications of concrete pipe.

Proceedings of Highway Research Board Now Available.—The papers and reports presented at the 21st annual meeting of the Highway Research Bureau, 2101 Constitution Ave., Washington, D. C., have been published as Vol. 21 of the Proceedings. This is a cloth bound book of 600 pages, and costs $3.25.

Scenes on National Route No. 5– Guatemala City to Pete. Quija-Cotalimax Section, Guatemala

By **CARLOS BICKFORD**
Assistant Director of Roads of Guatemala

No. 1.—Typical limestone formation through which the road passes.

No. 2.—Construction: Making a Telford base by hand. The workmen are residents of the district.

No. 3.—Typical formations of limestone in the region.

No. 4.—Laborers breaking the limestone.

No. 5.—Showing the manner in which the limestone was moved before construction machinery was introduced.

No. 6.—When the first equipment came—the first D8 Caterpillar Tractor. Today many of these tractors are being used on this road and throughout the country.

No. 7.—Compare this with the work shown in Photo No. 5.

No. 8.—This stretch, already finished and open to the traffic, is the same as that shown in Photo No. 2.

No. 9.—This section of road, now completed and in use, is on the site shown in Photo No. 1. Some stretches on this route ran as high as 90% rock.

Street Widening With Heavy Equipment

ACCESS road and street construction right now is high priority work. Military traffic must keep rolling over pavements and trucks and vehicles essential to the continued operation of war production plants must go through with a minimum of interruption.

In San Francisco just such a project is under way on Lombard Street between Van Ness and Richardson Avenues. Two developments traceable to the war made widening of this 12-block long section necessary: It is an important link in the truck route to the Golden Gate Bridge and it is the major artery to the Presidio of San Francisco. Truck traffic has increased to the point where the existing route was insufficient to handle the load, and with an expanding army, military movements have spiralled since December 7.

Nature of Work

The project involves most of the phases found in any major street reconstruction. There is demolition of old pavement, curbs and gutters and foundations of houses that were moved to make way for the new alignment; installation of sewers, grading, paving with both portland cement concrete and asphaltic concrete, and construction of traffic separation strips.

Bids were received Aug. 13, 1941, and Charles L. Harney, San Francisco contractor, was successful bidder at $338,071. The contract was awarded shortly thereafter, and work was begun in a few days. Anticipating delays due to material shortages and because the contractor, in common with most of the larger operators in the area, has other work of a more immediately essential nature, a full year was allowed by the city for completion. Another factor which will continue to retard progress is traffic, for the work must be scheduled in such a manner as to allow vehicular movement without detouring. Then, too, the contractor must allow access to abutting property.

There were 13,850 cubic yards of pavement excavation estimated, including the old surfacing, curbs, sidewalks, and foundations; and 15,500 cu. yds. of common excavation. The contractor started on this phase as his first step; using Lima 2-yard and ¾-yard shovels equipped with preformed wire rope to load Chevrolet and Mack trucks. The Limas were put to work rooting out the old foundations and dumping the debris as it came into the trucks. Where the old concrete was more than 6 ft. below ground surface, jackhammers were used to cut it before the shovel dipper went in. This provision was made to safeguard against disturbing foundation soil.

By using the shovel to remove the old structures, the contractor was able to save much valuable time that might otherwise have been spent in preliminary breaking of the old concrete. However, such service places unusually severe stresses on the shovel lines, so to enjoy fullest returns from both equipment and material, the contractor has outfitted the shovels with preformed wire rope.

As mentioned previously, the Harney organization has a large amount of direct war work, and on such jobs every minute is vital. Preformed wire rope lasts longer on the shovels, and when it finally does wear out, the new rope is installed much faster as it is less cranky and when cut does not require seizings—another way to save the "golden minutes" of today.

The contractor also uses the shovels to remove the old granite curbstones and place them in the truck for hauling away to the city corporation yard where they are redressed and used again. A chain is attached to the dipper teeth, slung around the curbstone, and then the slab is hoisted into the truck.

Common excavation is done with power shovels, and the material, largely sand and clay, is hauled away in Chevrolet 6½-yd. and Mack 8-yd. trucks. Dirt is disposed of at the nearby San Francisco Yacht Harbor. With broken concrete, however, the contractor is not so fortunate, for he must haul it to the beach at Taraval Street., a distance of perhaps 7 miles, where it is used for riprap.

Sewer Construction

Sewer work involves rebuilding the existing line on the north side of Lombard Street, installing a new line on the south side, new sections up three feeder streets, and new services to home adjacent to the new work. Altogether, 16,600 lineal feet of vitrified pipe is being laid, of which the major portion is 7,000 feet of 12-inch for the new Lombard Street line.

To excavate the trenches for these lines, the contractor converted the ¾-yd. Lima into a trench hoe. The widening of Lombard Street made it

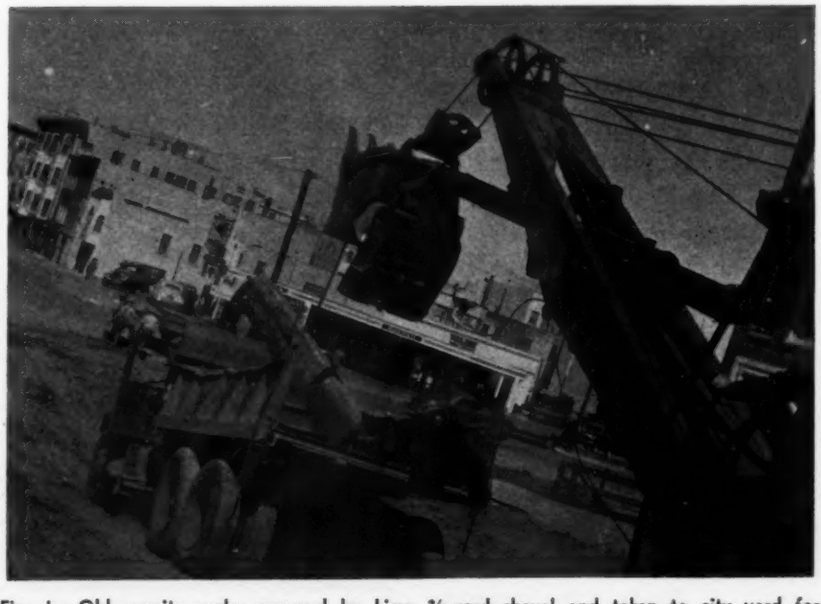


Fig. 1.—Old granite curbs removed by Lima ¾-yard shovel and taken to city yard for redressing

Fig. 2.—Excavating foundation for new pavement with 2-yard power shovel

necessary to slope intercepting avenues back, and at three locations the excavation went down so far as to intercept the existing sewer lines feeding into the Lombard Street main. This necessitated re-laying the lines deeper. The feeder lines were dammed above the portion being rebuilt, and pumps were used to handle the water from services in the area under construction into manholes at lower elevations.

An interesting method of construction was employed at several locations where the new main sewer line passed through unstable sandy soil. The pipe was set on brick piers and encased in concrete, 7 inches below, 6 inches on the sides and 4 inches over the top of the pipe. The purpose of this construction was, of course, to bridge the unstable areas and eliminate the possibility of the line breaking. In backfilling the trenches, Gardner-Denver pneumatic tampers were used where clay was encountered. A Gardner-Denver 210-cfm. compressor supplied air for this and all other air operations.

New Pavement

The pavement design is in accordance with City of San Francisco specifications for major streets. Previously, Lombard Street was 44.75 feet wide from curb to curb and had 12-foot sidewalks. All houses were set back on the south side, and right-of-way obtained to provide ten-foot sidewalks, two seven-foot parking strips, two 30-foot roadways, and a 6-foot raised centerline divisional strip with combination curb and gutter, giving the new roadway a width of 100 ft. from property line to property line. Electroliers will be installed in the separation strip under a later contract.

Pavement will consist of an 8-in. thick concrete slab with 2 in. of asphaltic concrete topping. In bringing intercepting streets down to grade, asphaltic concrete surfacing 2 in. thick will be applied over a 6-in. crusher run base. Where the grade is excessive—and it often is in San Francisco—a concrete traction strip will be constructed in the centerline of each street. The strip will vary from 13 to 17 ft. in width, and will be 6 in. thick. It will be given a non-skid texture with a hand float.

Weakened plane joints of the submerged type are being installed on 20-ft. centers along the pavement. Instead of following the usual practice of constructing dummy joints after the concrete is poured, the city has adopted the method of staking down ½ in. by 4-in. Oregon pine boards across the roadway and then pouring over them. According to data collected for several years, this method provides a smooth riding surface, with cracking confined to slightly irregular hairlines above the joint. In placing the concrete over the boards, only casual attention is necessary to prevent displacement.

Two Austin-Western 99-M motor graders are being used to shape the subgrade; rough 'dozing after the shovel and using the moldboard for finish shaping. Then Blaw-Knox steel forms are installed, and a home-made subgrader riding on the forms completes the final grade. No imported material is used in the subgrade, with the exception of a 6-in. layer of red shale which is placed under the forms. This is done to prevent the forms from sinking below grade under the weight of the paving equipment, and gives more uniform results than the less satisfactory method of using stakes to support them.

A 34-E dual drum paver will mix the concrete for the pavement which will be finished with a Lakewood finisher equipped with vibrating screeds. Asphaltic concrete will be hauled in trucks from the contractor's portable plant in San Francisco.

Quantities and Supervision

Major quantities for the project include 13,850 cu. yds. of pavement excavation; 15,500 cu. yds. of common excavation; 16,600 lin. ft. of

Fig. 3.—Rough-grade for new slab was bulldozed with Austin-Western 99M motorgrader

Fig. 4.—Left—Charles M. Taylor, Supervising Engineer for City of San Francisco; Right—Frank J. Lewis, Resident Engineer

vitrified pipe in varying diameters; 67 manholes; 78 catchbasins; 13,350 lin. ft. of white concrete gutter and 9,960 lin. ft. of combination curb and gutter of white concrete; 369,100 sq. ft. of 8-in. concrete pavement on Lombard Street; 72,300 sq. ft. of 2-in. asphaltic concrete pavement on side streets; and 96,000 sq. ft. of 3½-in. concrete sidewalks.

Supervising the job for the contractor is V. E. Huesto. For the city, Frank J. Lewis is resident engineer; John J. Casey, city engineer; Charles M. Taylor, supervising engineer; and Henry Ohman, designing engineer.

Use of Bituminous Materials Restricted in 21 Additional States

The Public Roads Administration of the Federal Works Agency, at the request of the Petroleum Coordinator for War, is extending control over the use of bituminous material in public highway work from 17 Atlantic Seaboard States to the western borders of New Mexico, Kansas, Nebraska, and the Dakotas. The Public Roads Administration is the official certifying agent for the Petroleum Coordinator for public highway work.

States newly included in the control area, by action of the Coordinator, are Alabama, Arkansas, that part of Florida not previously included, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Nebraska, New Mexico, North Dakota, Ohio, Oklahoma, South Dakota, Tennessee, Texas, and Wisconsin.

The procedure to be followed by governmental agencies in the new area in applying for bituminous material is the same as that used previously in the Seaboard States. It is based on "Recommendation No. 45, Amended" of the Petroleum Coordinator for War that road or street use of asphalt or of any asphaltic product, including road oils, or of tar or any tar product, shall be deferred for the duration of the emergency, except in the case of projects certified by the Public Roads Administration as "necessary to the successful prosecution of the war."

The Petroleum Coordinator's recommendation was based on the shortage of tankers and tank cars in relation to the exceptional wartime demand for their services and on the extensive requirements for war uses of the available supplies of bituminous materials.

It is directed to all governmental agencies "having jurisdiction over the construction, reconstruction, maintenance, or repair of roads and highways . . . and to all suppliers of asphalt and asphaltic products and tar and tar products" in the area roughly defined as east of the Rocky Mountains.

An applicant for "a certificate of necessity of use of bituminous road material" must be the "authorized representative of the governmental agency having jurisdiction over the roads, streets, or highways on which such use is to be made," according to the Public Roads Administration.

Application must be made on a special form, B-1, copies of which are available from State highway departments or district or State offices of the Public Roads Administration.

The official applicant must supply "all pertinent information required for a finding by the Public Roads Administration that (1) the road, street, or highway described is necessary to the successful prosecution of the war, including the continuing accommodation of essential civilian traffic, and (2) the proposed use of bituminous road material is essential in the kind and amount described."

These two points are the basis of review and approval or disapproval of applications by all officials authorized to perform this function.

All applications except those of Federal agencies must be submitted to the State highway department of the State in which the road or street described is located. This department reviews and recommends approval or disapproval of each application and then forwards it to the District Engineer of the Public Roads Administration.

The District Engineer is authorized to give final approval to all applications relating to road or street projects previously certified as important to national defense by the War or Navy Department or other appropriate national war agency, and to projects for which a Project Preference Rating Order P-19e has been issued. His approval is contingent upon his finding that use of bituminous material of the kind and in the amount applied for is essential.

The District Engineer will disapprove all applications relating to roads and streets that are definitely ineligible under the limitations of Recommendation No. 45, Amended.

The District Engineer will review, make recommendations for approval or disapproval, and forward to Public Roads Administration all other applications. The Public Roads Administration will in turn review and approve or disapprove such applications.

All applications will be returned to the applicant with approval or disapproval indicated by either a District Engineer or the Washington Office of the Public Roads Administration. An approved application or a photostatic copy is to be accepted by suppliers of bituminous road material as evidence that such materials may be purchased in the kind and amount designated.

▼

Large Attendance at ASTM Meeting.—The 45th annual meeting of the American Society for Testing Materials, June 22-26, had a registration of 1376, as compared with the high mark of 1441 in 1940.

Maintenance Problems of California Coast Highway

By T. H. DENNIS
Maintenance Engineer
California Division of Highways

THE formal dedication of the Carmel-San Simeon Highway in June, 1937, marked the opening of the present coast route between Monterey and San Luis Obispo, Calif. Up to that time, this rugged sea coast flanked by the impressive Santa Lucia range had presented a seemingly impassable barrier to any man-made highway. Towering high above the ocean, the new road opened up a region of rugged beauty and unsurpassed scenery.

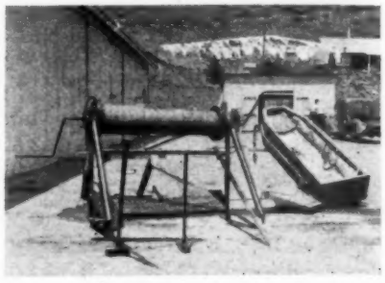
Construction Details

The construction of this 93-mile link, two miles of which are bridges, had progressed intermittently over an 13-year period and cost some nine million dollars. The roadway section varies from 20 to 26 feet in width with excavation slopes ranging from vertical to ½ to 1. The Lucia range along which it lies has unusually precipitous slopes and its shattered formation is disturbed by every ocean storm. As these storms are frequent, the annual rainfall being 50 in., it has been necessary to close the road some 60 days each year between December and April either for the protection of traffic or the removal of slides. Since the opening of the road maintenance crews have removed 2,500,000 cu. yd. of slides, a yardage equal to one-fifth of that handled in the original construction.

Route Served By Three Maintenance Crews

The route is served by three maintenance stations located some 30 miles apart. Each station has a force of 15 men together with a ½-cu.-yd. power shovel, five heavy dump trucks, one motor grader, three crawler type tractors equipped with angle dozers and a truck mounted snow plow for pushing rock off the road surface on night patrols.

Due to the highways general exposure constant patrolling is required over the greater portion of its length during a storm. The critical period is immediately following the slide when drainage is blocked. Unless the water is directed at this time it breaks over embankments washing thousands of yards of material into the ocean. To partially safeguard against this contingency, earth berms are built along



Rescue Sled and Winch

The Rescue Sled

Slide 1 mile south of Big Creek

Slip out 1.9 miles south of Big Creek

the edges of all high embankments. Blocking of drainage is particularly aggravated at steep canyon washes where large boulders with the first run-off thunder down and block the culverts. White Gulch is a particularly aggravated example of this kind. Multiplate culverts of large diameter are continually being washed out or blocked at this location. Once in the latter case three of the maintenance crew who attempted to remove the plug from the down stream were washed out into the ocean on its sudden release. Fortunately, their rough ride down the mountainside and plunge into the ocean resulted in nothing more serious than bruises.

Rock slide on Feb. 16, 1940

Auxiliary Equipment Stations Established

Since the highway along the coastal portion is only accessible from either end, auxiliary sheds for storage of equipment and operating supplies are established near major slide locations. They have proved their worth on numerous occasions when intervening slides blocked the access of equipment from the permanent stations to these critical locations. The slide material, which is generally overcast, is handled by power shovels and 55 h.p. crawler type tractors equipped with angle dozers. These latter units are particularly effective when the material is in a wet or semi-soupy state. Slide removal on this coast section during the period of its maintenance has totalled some $700,000 or an average of $550 per mile per year. This figure represents 50 percent of the total maintenance cost.

Removing slide with power shovel

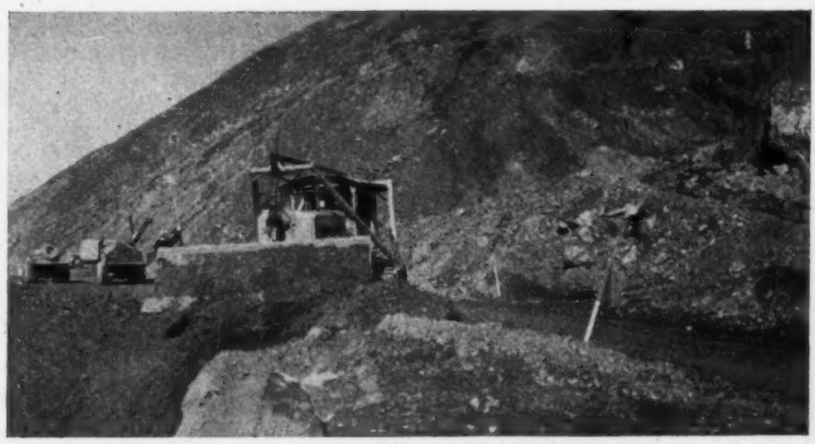
Painting Steel Structure

Many of the two miles of structures along the route are of steel design and their exposure to the salt air and ocean fogs create a formidable painting problem. The land side of the steel members where the condensation never dried out is particularly affected. Various types of paint were tried out in conjunction with the dehydrating of the steel. Finally the steel was washed with fresh water in advance of the dehydrating, and this procedure, by which the salt film was removed, ended the trouble. The determination of the presence of salt film was made by the paint crew who washed the steel with a piece of clean gauze saturated with distilled water. This was wrung into a receptacle to which nitric acid and silver nitrate were added. If the test indicated the presence of salt, the steel was rewashed until further tests revealed a negative reaction.

The standard of alignment on the road is rather high considering the character and roughness of the country.

The Rescue Sled

Though but four cars have left the roadway since its opening, these resulted in a number of fatalities. Their rescue involved several hours of arduous work on the part of the maintenance crews due to the care required in carrying the injured up the precipitous slopes, on make-shift stretchers. This situation prompted the development of the rescue sled, which resembles a coffin and is constructed of plywood and shod with steel runners. Provision is made for a cable hitch at the head, and handles



Removing silt and debris and filling wash at White Creek

are arranged along the sides to guide it.

When an accident occurs the nearest doctor is notified and the crew then proceeds to the rescue with the rescue sled and hoisting winch. Since the crew is versed in first aid it is only a matter of minutes before the victim is properly transferred to the sled and hoisted to the roadway. This saving in time and discomfort adds materially to the individual's chance for recovery. The rescue sled is now used on all mountain and coast highway routes.

The San Simeon-Carmel Highway has an exceptionally low accident rate, and more women drivers are to be found on it than any similar route. The lure of its scenery is amply attested by the 162,750,000 vehicle miles which have occurred throughout its length since its dedication. Though maintenance has been difficult, this service has been provided at a cost of less than ½c per vehicle mile.

Preference Ratings Simplified and Standardized

An amendment to Priorities Regulation No. 3, announced June 12 by the Director of Industry Operations, simplifies and standardizes the use of preference ratings.

Effective July 1, any preference rating, no matter how it has been assigned, may be applied or extended by a single form of certification, which states merely that the purchaser certified to the seller and to the War Production Board that he is entitled to use the preference ratings indicated on his purchase order, in accordance with the terms of Priorities Regulation No. 3.

Provisions of existing orders which require a purchaser to furnish his supplier with copies of preference rating orders or other special certifications are all rescinded, except for the special provisions of Priorities Regulation No. 9 with respect to the application of preference ratings for certain types of exports. This change does not, however, affect any provision of existing preference rating orders which limits the kinds of material which may be obtained by use of the assigned rating, or which requires specific information on purchase orders.

In addition to the standard certification, orders on which a preference rating is applied or extended after July 1 must also include the identification symbols required by Priorities Regulation No. 10, which established the Allocation Classification System.

The amended Regulation No. 3 restricts extension of preference ratings, in most cases, to material which will be delivered to, or physically incorporated in a product delivered to the person to whom the rating was originally assigned, or which will be used to replace in inventory materials so delivered, subject to definite limitations. A rating may not be extended to replace materials in inventory except to the extent necessary to restore the inventory to a practicable working minimum. No rating higher than A-1-b may be assigned to orders for replacement of materials in inventory, even though the order for which the materials were used may have carried a higher rating.

A "basketing" provision permits the simultaneous extension of ratings which have been assigned by different preference rating certificates or orders on a single purchase order. When ratings are basketed in this way, the lowest rating may be extended for the whole order, or the various items in connection with which the ratings are extended may be listed separately, with the corresponding rating applied to each.

Special provision is made for small manufacturers not operating under the production requirements plan. Such producers may extend ratings to deliveries of operating supplies including lubricants, small perishable tools, etc., which are required and will be consumed in filling the order which they are extending, but the cost of such operating supplies must not exceed 10 per cent of the cost of the materials to which the rating is extended and which such supplies are used to process. Not more than 25 per cent of the operating supplies obtained in this way during any month may be metals in the forms described in the metals list of Priorities Regulation No. 11.

Class I producers as defined in Priorities Regulation No. 11—large users of metals required to apply under the production requirements plan—are prohibited from extending ratings assigned on their PRP certificates or ratings specifically assigned to them for construction or acquisition of capital items. Ratings assigned on PRP certificates, like all other ratings, will be applied by the standard form of certification prescribed by the amended Regulation No. 3.

County Smooths Rough Surfaces

Panama Lane near Bakersfield, California, in Kern County, became too rough. The surface needed smoothing so this tractor and disc outfit was put to work with a specially made drag. When Kern County needs a tool the well equipped District Yard and Shops makes it.

Use of Aerial Photographs in War-Time Soils Engineering

By DONALD J. BELCHER

Research Engineer Joint Highway Research Project, Purdue University

IT has been well established in this war more than in any other, that thorough planning, proper timing, and brilliant execution of plans are the essentials of a successful campaign. Our foes have established an excellent record so far and it remains for our forces to out-plan as well as to out-fight them. Surprise in the same degree that they have achieved will be rare; therefore, after planning, the timing and execution must not falter.

Transportation and supply are among the most difficult tasks of an aggressive campaign and in the corners of the world in which these campaigns may be conducted the tasks will not be simplified by the unusual conditions. Military roads and airports in new locations will be the backbone of transportation in many theaters of action, especially in the Far East. There will be many "Shangri-La's." In planning these elements of transportation, soils engineers can render vital service by advising on and recommending locations that will give the best service. When time alone may mean the difference between success or failure an unstable runway or an impassable road may be the critical factor. The importance of these elements have been harshly demonstrated both in maneuvers and in actual combat. The advice and planning of soils engineers may often make the difference between passable and impassable roads; they may avoid poor locations for airports that involve time-consuming drainage installations.

The principles contained in this article are fundamental and not specifically limited to war-time usage. However airports and other military uses have been emphasized rather than ordinary highway work. The need for speed and the ever-increasing use of airphotos gives the military aspect a special significance at this time.—EDITOR.

In areas of unfamiliar soils and in climates where 100 to 150 in. of rainfall per year are common, the mechanized armies will require the best roads obtainable and the ever-increasing bomber loads will demand more than average stability of runways. In these phases of modern warfare the soils engineer can play an important part in obtaining the final victory in a shorter period of time and at a minimum loss of life due to disrupted plans.

Foreign Soil Conditions

With these tasks facing the military engineers, every opportunity must be taken to utilize modern methods in engineering. American soils engineers are going into these new countries during this war and in the following peace. In neither instance is it likely that they will have ample time to study the situation thoroughly or to submit samples to laboratories for thorough analysis—certainly not in war time.

Lacking the proper facilities the soils engineer must fall back on experience gained at home, and therein lies a primary difficulty. There is not a present or future field of action in the world where the soil conditions will be comparable to those in the United States, of any one state, or of an area. As an example of foreign soil conditions consider the mixed emotions of a soils engineer charged with the rapid design for runway thickness for a runway to be placed on the Matanzas red clay soil of the West Indies and Central America when he learns that the clay content exceeds 90 percent. Since soils of the United States seldom contain more than 60 per cent of particles of the clay size, the thought of a soil containing 90 per cent of clay would cause most engineers to suggest a relocation. Actually this soil is an ideal subgrade material for either highways or runways. It occurs on flat terrain and readily absorbs large quantities of rainfall in a climate that averages 70 in. per year. Large areas of soils of this type (lateritic) also occur in Africa, India, South China, Maylay, South America and in other humid-tropical climates. The terra rossa

Fig. 1—An illustration of the type of soil pattern commonly developed on relatively impervious silty-clay in an area of flat terrain

Fig. 2—Characteristic appearance of a free-draining soil in which the absence of surface runoff creates a uniform soil condition over large areas. The tortuous pattern of the ancient channel indicates a flat terrain

soils of the Mediterranean basin also belong to this class as do the middle-altitude belts of soil in Java and Sumatra. In contrast, the associated, although highly plastic, Bayamo, Herrera, and Viñales clays possess qualities that make it advisable to avoid them if at all possible. Members of a general soil group such as this may occur at widely separated points. Large areas of Alaska and Canada have soils in common that have consistent engineering properties. The so-called regur or "black cotton" soils of India, Africa and eastern Java are similar although widely separated. The problems of one soil in an area are identical with the problems created by similar soils in other areas. The task then, is to differentiate between these soils and to recognize them when they are encountered. This may be accomplished by acquiring a proper and enlarged perspective of the process of soil formation and distribution.

A New Perspective to Soil Surveys

These statements may seem somewhat unusual but scientific study has proven them to be true. The following statement, given in a simplified form, presents the logic behind this truth; *soils developed under the same conditions of climate, topography, and parent material are related and will have similar engineering properties.* In very old soils the influence of the parent material (bedrock, glacial drift, loess, etc.) often disappears. When understood and properly applied, this relationship can vastly simplify the details and expand the field of soil engineering.

These facts should give new perspective to the soil survey operation. The soil survey may now provide an active foresight rather than a more-or-less passive hindsight. These principles give the soils engineer a grasp of the soil situation of an area or region and places a picture of the basic pattern of soil occurence in his mind. Profiling should then be used judiciously to check his observations. The principle of recurring profiles has been verified over wide areas as has been illustrated by previous statements on the occurrence of soil groups. A corollary to the first fundamental statement is that: *similar soils will be found on similar slopes and in similar positions.*

Services That Can Be Rendered By Soils Engineer

The great soil groups of the world have been fairly well defined and located. Something is known about the soils of every country; it remains for the engineer to utilize this knowledge and apply it. In a given area, the well-drained soils should be rapidly differentiated from the poorly drained; the presence of granular deposits should be anticipated and cataloged. Soils and rock formations conducive to landslides should be recognized for the purpose of avoiding dangerous locations or for the purpose of bombing when in enemy territory. In this respect there are numerous locations on the major highways of this nation that can be placed in this latter category in an invader's viewpoint.

All of these services can be rendered by competent soils engineers equipped with the proper understanding of soil formation. With some experience, the interpretation of airphotos alone will reveal an astounding amount of information concerning soil conditions. Some knowledge of local conditions will aid in the interpretation and the judicious sampling of varous soils in the area in question will yield an almost complete picture of the engineering properties of the soils and the problems that will be encountered.

Pedology, the study of soil formation, has long ago determined the principles that govern profile development. The scientists in this field have produced scores of maps and volumes of material locating and describing the soils of the world. It remains for the engineers to incorporate these principles in their work and to convert it to their use.

Use of Airphotos in Interpreting Soil Conditions

Because of the importance of airphotos in interpreting soil conditions, special attention will be given to this phase of the work. Physical features and topography can be obtained from airphotos by methods of direct measurement. Soil conditions are established by "implications" that appear in the picture. An experienced observer reads the signs that "imply" soil conditions and associates them with soil problems that his experience tells him will be encountered.

To illustrate some of these points a number of photographs are shown. Different styles of drainage pattern carry significance with respect to topography, texture of the soil, and its drainage characteristics. Examination of Fig. 1 shows that a small stream develops and flows with wide meanders across the area. This indicates two principal points, namely that the general drainage area is flat to gently undulating causing the meanders to form in wide, smooth curves, and that the soil has a fairly heavy texture. The fact that small streams develop and meander indicate that surface runoff dominates the drainage phase. This is strengthened by the fact that the soil pattern develops in an unmistakable manner common to heavy-textured, slow-draining soils in the climate of the particular region. The light-colored areas are level, heavy silty-clays and the dark

Fig. 3—An airphoto of a region in which the soils have resulted from the weathering of limestone. The small circular spots on the ground surface indicates the presence of sinkholes resulting from the caving of subterranean channels

areas are slight saucer-like depressions having an organic topsoil and a high water table. Too often airports are placed in locations such as this because of favorable topography and without full appreciation of the drainage conditions. Fig. 2 similarly shows a flat terrain as indicated by the nature of the old channel. However, the important point illustrated in this figure is the absence of a developed soil pattern. The proportion of surface runoff to percolation governs, in a large measure, the development of the soil pattern. In this instance the absence of a pattern indicates that the entire rainfall is absorbed by the soil and that surface runoff does not occur. Obviously the soil is well drained internally. From further examination of other photos in the same flight strip, signs of wind erosion and half-moon shaped hills confirm the assumption already made, that the soil is a free-draining sand. The presence of ditches indicate that the sand is relatively shallow (eight or more feet) and is underlain by an impervious layer. Given the simplest form of drainage, this area is ideal for either highway or airport location, the sand providing ample stability under all conditions of moisture.

Figure 3 is an illustration of an entirely different type of area. The circular areas are called "sinkholes" in the United States or "sumideros" in the West Indies but whether the airphoto was taken in India, Indiana, or Indo-China the circular depressions imply the presence of limestone bedrock which in turn implies a residual soil of a certain nature depending upon the climate of the locality. Once sampled and tested, the soils shown in these pictures can be related to soils of the surrounding areas on the basis of the principles outlined.

Methods of Interpreting Airphotos

A very brief listing of the possible points that imply soil conditions gives a clue to the methods of interpreting airphotos and will form a basis for practice. Steep valley-sides indicate stable soils or rock; flat slopes of valleys showing light, lace-like borders indicate an erosive soil, probably a silt. The angle at which tributaries enter a stream is significant; hills of certain shape or outline imply a windblown origin that in turn implies a very definite limit on the maximum particle size as well as a characteristic gradation. Innumerable signs of similar nature can be used and they are limited largely by the experience of the engineer. One of the very important uses of this skill is in the location of deposits of granular materials beneath the surface of the soil. This is especially valuable in locating sources of borrow material and is accomplished by a combination of the knowledge of the formation of these deposits and detecting the signs that imply the presence of a porous substrata.

We can be sure that in the period following the war there will be a need for engineers in the various countries of the world. Our government and the people of all free countries are thinking ahead to the time when a great effort must be made to create an adjusted world. This will be a time of construction in which an integrated system of transportation and communication will provide a framework upon which the world may build a more satisfactory society.

In the building of this transportation system the soils engineer can play an important part. If the leaders of nations have initiated plans for solving post-war problems then it behooves the engineers, upon whom much of the work will fall, to make ready for the problems that will confront them.

Spring Meeting Illinois Road Builders Association

The annual spring meeting of the Illinois Road Builders Association, held June 3 at the Drake Hotel, Chicago, Ill., was attended by 200 members and their friends.

Henry Fowler of Chicago, president of IRBA, presided over the general meeting, introducing Walter A. Rosenfeld, Illinois state director of public works and buildings, who, in turn, introduced Wesley K. Polk, new chief engineer of the Illinois Highway Division. One of the principal guests was Capt. R. D. Spalding, Public Works official at the Great Lakes Naval Station, who reported generally on the construction progress at the station.

One of the most interesting parts of the program was an "Information Please" lecture conducted by Taylor G. Soper, executive secretary of IRBA. In this representatives of government agencies answered questions submitted to them by contractors regarding regulations relating to construction equipment. Representatives of the government agencies included: Donald Booz and Alfred Petscheft of Washington, chief and senior attorney, respectively, of the machinery division, OPA; Edmund H. Eitel and Earle S. Heffley of Chicago, WPB officials, and R. H. Harrison, a regional engineer of the Public Roads Administration. The meeting was preceded by a cocktail reception and dinner.

$110,000,000 *More for Access Roads.* —The House of Representatives on June 23, accepted the Senate amendment to HR 6908 authorizing an additional $110,000,000 for access roads.

Speed in Construction of Access Road

By M. B. HODGES
Maintenance Engineer,
Texas Highway Department

IN the first part of February, 1941, the Texas State Highway Departmen was advised of the early construction of Camp Hood located north and west of Killeen. No paved highways were accessible to the entrance of the proposed camp and we were requested to provide at the earliest possible date an adequate highway facility from Killeen to a point about 2¼ miles west. It was quite fortunate that the location of this access road coincided with the approved location of U. S. 190 from Killeen to Lampasas. It was also quite fortunate that the construction of this highway from Killeen to Belton to a connection with U. S. 81 was nearing completion and would be completed prior to inauguration of the construction of Camp Hood. The pressing problem, however, was to construct the additional 2.2 miles in the shortest possible time.

After a conference in the office of D. C. Greer, State Highway Engineer, it was decided that in view of the very limited time the work would be done by force account under the direction of D. M. Puckett, District Engineer of District No. 9. Mr. Puckett was advised by telephone of this decision and he was requested to start construction of the project immediately. The assistance of this office in perfecting an organization was offered. Plans had already been prepared for this section of U. S. 190 and all that was necessary to accomplish the work was to perfect an organization, secure the necessary materials and get the job done.

5-Span Bridge Constructed by Contractor

Wire bids were taken for all materials necessary to construct the drainage structures and shipments of steel, sand, gravel, lumber and cement were started immediately. Mr. Puckett's maintenance forces started at once excavating for the small structures. But within the limits of the project was one large structure, a 5-span reinforced concrete girder bridge which presented quite a problem as we were not equipped to construct such a structure in a short time. Several contractors were contacted regarding the possibility of constructing this bridge by force account methods and L. A. Turner agreed to furnish the necessary equipment and construct the bridge with his men. An agreement as to rental rates for the equipment was made and it was agreed that the state would pay Mr. Turner actual labor cost plus the usual 15 per cent. The state would furnish all materials necessary for the construction of the bridge.

Equipment Leased from Contractors

The department owns very few units of large earth moving equipment and several of our contractors were contacted relative to the possibility of leasing such equipment with operators. Allhands and Briley agreed to furnish several units including a D-8 Caterpillar with a 12 cu. yd. Le Tourneau; a D-7 Caterpillar with a 7 cu. yd. Le Tourneau; an A-C Tractor with a bulldozer and sheepsfoot roller; a second A-C Tractor with a bulldozer, and an A-C Motor Grader. Included in the state equipment placed on the project were two shovels of 1½ cu. yd. capacity, motor graders and trucks.

State owned equipment excavating channel

A section of the completed highway

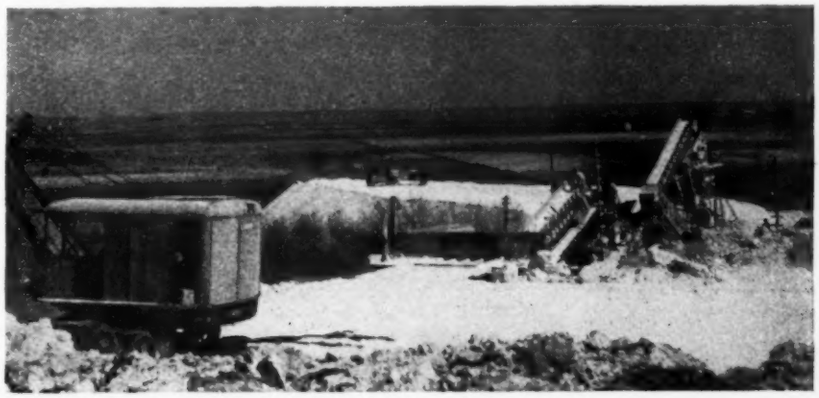
Work Started on Feb. 13

Mr. Greer contacted each member of the State Highway Commission by telephone and secured unofficial sanction of the proposed project. Mr. Puckett was advised of this action and was requested to start work on the project immediately, and the work was started on Feb. 13. The

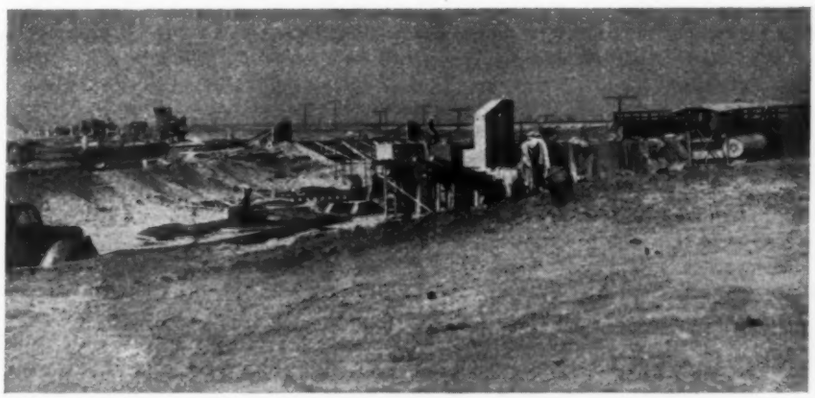
Two power scrapers owned by Allhands & Briley at work in heavy clay cut

Commission met in regular session on Feb. 20th and passed Minute No. 19020 which authorized the work and appropriated the sum of $84,133.20 to cover the estimated cost. The work involved the complete construction of a section of highway on U. S. 190, 2.229 miles in length, extending from Killeen west to a point opposite the proposed entrance to Camp Hood.

The Public Construction Co. at the time had a contract on another section of the same highway between Killeen and Belton covering the construction of a flexible base and asphalt surfacing. W. M. Jagoe of this firm was contacted and an agreement was made with him to excavate, crush and stockpile approximately 30,000 cu. yd. of caliche and stone necessary for the construction of the flexible base. The material site was approximately three miles south of the section of highway. The state did not own a crushing and screening plant of such a capacity to process the material in a short time.



Producing the aggregate. In center foreground is stock pile of crushed caliche and stone totaling 28,000 cu. yd. To right is the crushing plant of the Public Construction Co., while at the left is a shovel owned by the same company



Construction under way on 5-span reinforced concrete girder bridge

Construction Well Under Way on March 1

By March 1 all units of construction were well under way and construction was proceeding at a very satisfactory and rapid rate. State maintenance forces were constructing the small drainage structures; Mr. Turner's organization was busily engaged in the construction of the bridge and Allhands and Briley's earth moving equipment supplemented by several units owned by the state were busily engaged in completing the necessary earthwork. On April 16th the project was 75 per cent complete and on May 1 the project was opened to traffic. State forces had hauled all the material necessary to complete the flexible base and had placed thereon an asphalt surface treatment. Some few small items of work such as sodding, finishing, etc., had not been completed but such items were non-essential insofar as the traffic facility was concerned.

In slightly over two months and prior to the inauguration of the construction of Camp Hood, the department had constructed an adequate and modern highway to provide access to a camp which was to further our war aims. Excellent workmanship was obtained and the work was performed well within the estimated cost. John W. Nichols was the foreman on the project and working

The completed 5-span bridge

under the direction of J. A. Hart, Assistant District Engineer and Superintendent of the project. D. M. Puckett as District Engineer was in responsible charge of the project and each of these men is to be commended for his initiative and untiring energy in developing and carrying to successful completion such a project. This work merely shows that what is necessary to be done can be done.

Federal Regulations for Construction Equipment Interpreted

A particularly interesting feature of the annual spring meeting of the Illinois Road Builders Association, held last month at Chicago, was a "question and answer" session conducted by Taylor G. Soper, executive secretary of the Association. In this session representatives of government agencies answered questions submitted to them by contractors. Representatives of government agencies included Donald Booz and Alfred Petscheft of Washington, chief and senior attorney, respectively, of the machinery division OPA; Edmund H. Eitel and Earle S. Heffley, of Chicago, WPB officials, and R. H. Harrison, regional engineer, Public Roads Administration.

Some of the questions and the ensuing discussion follow:

Chairman Soper: Mr. Booz, here are a couple of questions:

Under Price Regulation 134 the applicable rate per month for a 13-cu. yd. self-propelled bottom dump Euclid is $1,220.00 for 240 hours' actual use in the month, and 1/480th of such rate for each hour's actual use over 240 hours in the month. X Equipment Company refuses, because of the previously prevailing practice, to rent the equipment to the contractor except on a month's basis, and then only on condition that the contractor pay the minimum of $1,220.00 per month, even though the equipment is actually used less than 240 hours in the month, their position being that, under the regulations, mere possession for the month is construed as being equivalent to actual use for 240 hours.

Is the position of X Equipment Company justified under Price Regulation 134?

Mr. Booz: X Equipment Company can insist upon a month's rental for the maximum of $1,220.00 for 240 hours' use, or possess it, in that case.

Voice: As an off-shot to that question, does that apply to private lessors? Say I own a steam shovel and I won't rent it for less than a month, but the contractor only needs it for 2 weeks. Can I require him to pay a full month's rent?

Mr. Booz: Under the maximum price regulation, if that is your established practice you are permitted to file that it is, and in the event you have not filed, then you have not availed yourself of that privilege, and therefore you cannot insist upon a month's rental.

Voice: Then, putting it the other way, must the equipment company prove to the contractor that they have filed that particular petition with the government before they can insist upon renting it on that basis; or putting it the other way, is the burden upon the contractor, if he rents it on that basis, to prove if necessary to the government that the equipment company had filed that schedule prior to the time called for in the Act?

Mr. Booz: That is a fine point. I am going to duck and ask Mr. Petscheft to answer it. I don't know.

Mr. Petscheft: The answer is "Yes," at least to the last question. The Act provides that minimum period practices in effect and established on April 15th may be continued, provided the satisfactory evidence of such has been filed according to sub-paragraph (b), 1399.5, under Reports. You do have the burden of establishing it in case the transaction is ever called in question.

The regulation, however, does not require that as a condition in advance of entering into a transaction that you voluntarily establish it to the contractor. I suppose if a contractor asked for reassurance on that point he would be entitled, as a matter of good business practice, to have it, because, you see, the regulation applies both to the Lessor and the Lessee, and one who rents equipment as a Lessee, in violation of the regulation, is as much a violator as the person who is the Lessor in the transaction.

So I suppose if he asked to be shown some evidence that you had filed and complied with the Section and were therefore entitled to continue this minimum rental practice in effect on April 15th, he would be entitled to get it. Don't you think so?

Voice: Then, following that, if the equipment company has failed to file such a petition with the government, it follows necessarily that he cannot rent on this minimum period basis; is that right?

Mr. Petscheft: That is correct, sir.

Voice: And the Lessee would be in violation of the Act if he did enter into such a contract with the equipment company?

Mr. Petscheft: In violation of the regulation.

Voice: If the equipment company failed to file that petition, which the Act provides should have been filed after April 15th?

Mr. Petscheft: Yes. I think I should make this comment: All of you will realize that where you are permitting the continuation of established practices, it is administratively necessary to require certain safeguards so that we may properly discharge a public trust. After all, the proper administration of this is that sort of a job, and we have to insist that if a contractor had such a practice he should file. To use a colloquial phrase, it is more or less the problem of getting your chips down in advance, you see.

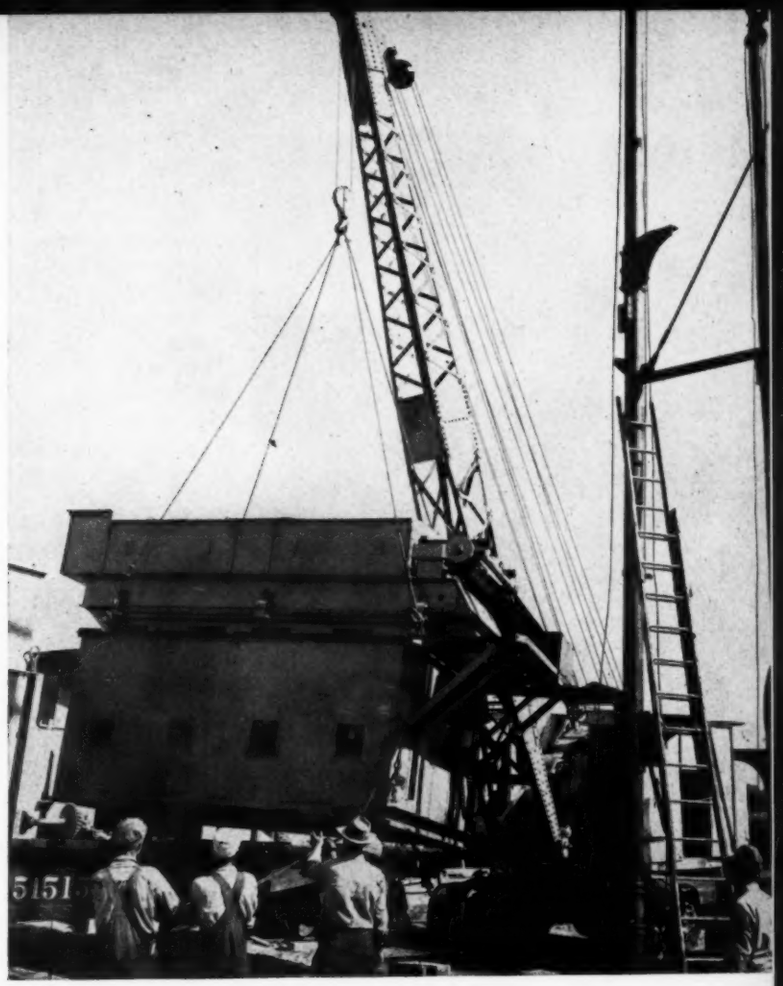
Chairman Soper: Any other questions as to that phase? That is a very pertinent question and has been asked of our office many times.

Voice: Mr. Petscheft, if a person does not want to sell for the ceiling price, can he be forced to sell if his equipment is for sale at a higher price and he says he won't sell it at the ceiling price? Can he be forced to sell or can he just hold it?

Mr. Petscheft: I don't suppose you deliberately intend to embarrass us by asking that question. (Laughter.) That is something of a diplomatic poser. You see, the sale of equipment comes under maximum price regulation 136, and with respect to sales, the established price in effect on Oct. 1—assuming there was such an established price—of course, there are other provisions, but let us assume it is a piece of equipment subject to an established price. That is the ceiling. There is nothing in maximum price regulation 136 which makes it mandatory upon a dealer to sell equipment which he has. He may elect to become a Lessor of that equipment which he has, under the provisions of 134, I suppose.

On the other hand, if he deliberately refuses to sell the equipment and holds it out of service out of a recalcitrant attitude, let us say, merely because he can't get the higher price he thinks he should, I suppose that equipment could be requisitioned if necessary. However, that latter phase of the question, I believe, is something we won't encounter, because we all are in this thing together, and such an attitude would hardly be found in a group like this.

The Life of A Wire Rope



Unloading the new Simplicity Asphalt Plant

By RUSSELL RALPH

Owner and Manager Kaw Paving Co., Topeka, Kans.

IT has been a problem for us to establish any sort of workable rule for discarding wire rope. Safety, of course, is the prime factor. But always the same question presents itself:

"When should the rope be changed?"

Often we have as many as two dozen machines on the same job at the same time—units which depend upon the proper functioning of wire rope—revolving shovels, drag line excavators, cable excavators, ditchers, hoes, skimmers, traveling and crawler cranes, and many others.

A broken rope with us usually means an accident. And besides the personal accident hazard, delays must be taken into consideration. The delay factor is to be considered more than ever today when every job is a mad rush to meet the dead line because of the national emergency.

And on the other hand we are all faced with the necessary and the patriotic requirement of conserving our equipment and making every foot of rope we have do every hour of ropework that is possible.

For a number of years we have kept a wire rope record, but it has not satisfactorily answered for us the question: "When should a rope be changed?" Every machine on every job, especially under conditions today, is faced with a different problem. New machine muscles are brought into play and that means new stress.

Then, too, there is the problem of green and inexperienced men. Our best men are going to the Army and Navy and into vital defense and war industries. This is as it should be. But it leaves us with more new men not accustomed to their machines. And more accident hazards.

With a stationary machine, doing a set amount of work every 24 hours, a wire rope record showing regular inspection findings will eventually set the proper life span for different types of cable. But paving and excavating contractors use few stationary wire rope equipped machines.

Rope

The best workable plan we have found for retiring wire rope is a three-point program:

1. Have all handling, inspecting, lubricating and rope reports on the entire job under the supervision of one man.
2. Wherever possible use preformed wire rope.
3. Buy all wire rope from one company and cooperate fully with that company's representative as to the type of rope to use and the retirement date.

Every foot of our wire rope is inspected regularly by our superintendent. He supervises the unloading and installing. He is there for the initial breaking in. If the man on the machine is an experienced operator, after the rope has been broken in, it is his job to inspect and lubricate and report to the superintendent.

We have lost several ropes in the unloading and because they were not given the proper "easy period" before being allowed to take the load. Regardless of whose fault it is, a kink resulting from using an iron bar on a reel in a car, or allowing it to drop, today, is an unpardonable sin. By having all of our ropes one man's business from the time they are ordered until the time when they are broken in, we have been able to do away with any loss from early damage.

For our use, we have found that wherever drums are small, where high speed is required, and where ropes must be handled a great deal by workmen, preformed rope adds greatly to the efficiency of our job.

Russell Ralph

We have been trying preformed for more and more jobs and in every case we have been pleased with the results. Accidents from snags and breaks have been cut in half. Kinking with the preformed has been an extremely rare thing and our rope loss due to kinks has been practically nil.

While the initial cost on the preformed is higher, it has been our experience that on small drums, preformed will outlast the same length of ordinary rope doing the same work, two to one. Our net rope cost over a two year period has been actually less than half what it was with ordinary rope where we used preformed.

Because of the much longer life, we have been able to retire preformed ropes before there was any safety-accident hazard and still save money by using the higher-priced cable.

We have made it a policy to buy all of our ropes from the same company. In this way, the salesman and the company field man have enough at stake in our account to allow them to give us tops in wire rope service.

The field representative works with our superintendent and they have devised a retirement program which is a combination of cooperation in service, adjustments, and care and inspection.

Our power crane had been equipped with ordinary rope. The superintendent and a company man decided that we would get better rope life from preformed, that we would be able to handle the job better, and that there would be less accident hazard. We made the change.

The first job for the big crane with preformed rope was unloading a new Simplicity asphalt plant which was delivered to us on three flat cars. We are using the plant to speed up our work on the new Government airport runways, at the training center south of Topeka.

Two company men were there at the unloading. The ropes had been previously broken in. I think the cables are better than they were before the job was started and I've never seen a tougher one tried.

P. H. Tursi, Superintendent, Kaw Paving Co., inspecting wire rope. All inspection is under his supervision

By cooperating with company representatives and by getting all of our rope from one company, we have been able to greatly lengthen the life of our ropes and have come nearer, I think, setting a "right" date for retirement.

By having our rope problem one man's problem; by relying on that man's judgement; and by using preformed wherever possible, I think we have come the nearest to answering satisfactorily the question for us, "When should rope be changed?"

Priorities for Levee Work

The following instructions have been issued to District Engineers of the Mississippi River Commission regarding application of the A-1-J rating for levee work and dredging in the lower Mississippi River:

1. Under date of September 29th, 1941, a preference rating of A-2 was assigned to levee work. The 'Type of Material Required' was stated in the application to be 'Replacement parts and minor materials necessary to keep the operation going.'

"2. Under date of April 21, 1942, a preference rating of A-1-J was authorized with respect to levee work for 'The repair parts and materials necessary for the maintenance and repair of the equipment required on this project.' The notice of authorization contained the following statement: 'Your attention is further invited to the fact that this rating is authorized for repair parts and materials only, and does not apply to equipment.'

"3. In order to have uniformity in practice between the several Districts it is desired that the following procedure be followed.

"As contemplated by the bid form, the contractor will be required to place upon the work equipment in good operating condition and in sufficient volume to maintain the rate of output required by the time limit established by the specification.

"When contractor's or subcontractor's equipment arrives on the job, it will be jointly inspected by a representative of the District Engineer and the contractor or his representative to verify compliance with the foregoing requirement. At that time the contractor will make an estimate of the parts and materials which will be needed to permit efficient operation throughout the ensuing 90-day period (or the duration of the job, if less than 90 days has been allowed therefor). The estimate will be reviewed by the representative of the District Engineer and forwarded to the District Engineer, who will furnish the contractor A-1-J preference rating certificates for the procurement of such of the items approved by the District Engineer's representative as the contractor desires to purchase, when he is ready to place his orders therefor.

"This procedure will be repeated at 60-day intervals until the job is completed, keeping in mind with respect to the final inspection, that the preference rating assigned pertains only to levee work for the United States and is designed to afford only such repairs and repair materials as are found requisite to keep the machinery operating efficiently while on the Government's levee job.

"The same A-1-J rating will also be given for requirements unforeseen at the time of regular inspections, if and when such needs arise, it being noted in this connection that an A-1-A rating is applicable for repair and maintenance parts where there has been suspension of operations due to damage or failure of parts and parts are not otherwise obtainable."

Using Broken Traffic Stripe Saves $71,000.—By substituting a broken 3-in. painted traffic stripe for the old 4-in. solid stripe, the California Division of Highways expects to save $71,000 this year for material. It is estimated that from 70,000 to 80,000 gal. of paint will be saved. The breaks will not exceed 25 ft. in length. It is planned also to use a broken double stripe.

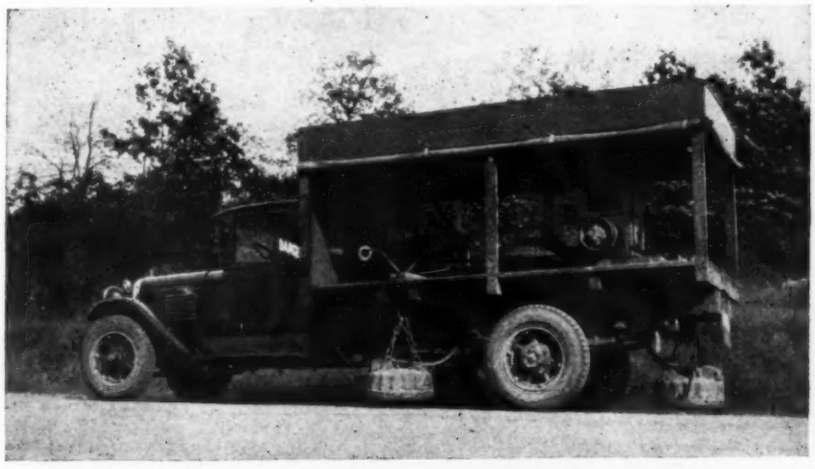
Road Magnet Picks Up 5,715 Lbs. of Metal

By R. M. WHITTON
Engineer of Maintenance
Missouri State Highway Department

MOTORISTS on Missouri's state maintained highway system can now drive with greater safety, at less expense, and with greater freedom from worry about about tire troubles. One of the most discouraging experiences to users of highways is that of having their tires punctured by metallic objects lying on the travelled road surface, This hazard is being reduced very materially by the use of a road magnet.

Maintenance engineers, conceiving the idea of removing nails, tacks, and other metallic objects from the travelled roadway, have devised and perfected a powerful electric magnet which will lift from the road and hold objects weighing as much as 3 lbs. This magnet, or rather three of them, are suspended from the chassis of a 1½ ton truck until they are about 4 in. above the road surface. The truck is then driven slowly over the roadway at a speed of only 10 miles per hour resulting in a complete pickup of all metallic objects which are lying loose on the surface. One trip will cover a road width of 8 ft. necessitating three trips to completely cover most roads.

The benefits to the Missouri motorist at this particular time when tires and tubes are not available and when even repairs are difficult to obtain immediately, are of inestimable value and the conserving of rubber made possible by this device is a truly worthy war effort, since many simple punctures result in blowouts and many tires are ruined because of inability to stop immediately after tires go flat. Changing tires along the road is costly in time and patience and often dangerous and if such labor and inconvenience can be obviated then the use of the road magnet is certainly justified.



Road magnet outfit of Missouri State Highway Department

Detail of Road Magnet

The complete unit, consisting of a 1½ ton truck, three round magnets 24 in. in diameter, a 135-volt compound wound generator equipped with panel, voltmeter, ammeter, automatic discharge switch and powered by a 5 h.p. gasoline engine (all of which equipment is mounted on the truck) cost, including the assembling, about $4,000. When operating this unit also carries an extra supply of gasoline and oil as well as some of the metallic materials picked up from the road. Since the magnets alone weigh 960 lb. each, the overall weight of this equipment is so great that special springs were found necessary.

Results of Operation

That there was need for this machine is evidenced by the following reports: After operating 55 days a total of 5,715 lb. of metal was removed from the road, averaging 105 lb. per day.

Another operation of 30 days averaged 132 lb. per day; a 31-day operation in a thickly populated section averaged 176 lb. of metal per day.

Records show that the pickup of metal per mile averages from 5 to 10 lb. per mile. During the month of March, 1942, an average of 10.2 lb. per mile was removed from the travelled roadway.

Cost of operation is estimated at approximately $500 per month, including operator's salary; and cost of cleaned road surface is estimated at about $1.20 per mile.

Metallic objects picked up by road magnet

OBSERVATIONS BY THE WAY

By
A. PUDDLE JUMPER

¶ A Puddle Jumper has gone to the Wars. His picture, above, indicates that he may be laughing at us as we scratch around for material to fill this page, the last one, by the way, for the duration. However, this is not the case. The photograph was snapped just after he had told a story at a Texas Short Course in Highway Engineering.

• •

¶ The bombing of the city of Cologne on May 30th by the British brings to mind a little poem written some 110 years ago by Samuel Taylor Coleridge which set forth quite concisely the sanitary conditions of the city at that time. Here is the poem. We are quoting from memory so may have left out a few lines as well as "several stinks."

"In Cologne, a town of monks and bones
And Pavements fanged with murderous stones
And hags and rags and hideous wenches
I counted two and seventy stenches.
The River Rhine, it is well known doth
Wash the City of Cologne,
But tell me Nymphs, what power divine
Shall henceforth wash the River Rhine."

• •

¶ Contributing greatly to the safety and convenience of driving over U. S. 30 west of Cheyenne, Wyoming, this city has installed creosoted posts along the shoulder lines of the road with a reflector button near the top on each side of the post. In the open spaces at twilight and on those black surfaced roads those reflector buttoned posts form an excellent guide on rainy nights.

• •

¶ Boss, to his Stenographer: "Are you doing anything Sunday evening, Miss Harvey?"

Stenographer (hopefully): "Why, no."

The Big Brute: "Then try to get down earlier Monday morning, will you?"

• •

¶ "At first it was love. He fascinated me—and I kissed him."

"Yeh, I know, and then he began to unfascinate you—and you slapped him."—*American Municipalities.*

¶ Herewith is a picture of a group of hungry soldiers who are getting a regular meal without cost to them. Joe Colucci, the proprietor of an Italian-American restaurant at 45 West 51st St., in New York City, figures that any soldier is a "broke" soldier. Joe is a good American and this is his way of doing his bit for soldiers who come to New York on leave and find themselves too short of cash to buy meals. They are sent to Joe through the U.S.O. Joe signs a bunch of his business cards in red ink and turns them over to the U.S.O., the Jewish Welfare Board, the National Catholic Community Service, and the Stage Door Canteen of the American Theatre Wing. These cards are given to worthy soldiers which, when presented to Joe, get them a regular, full meal in his neat, clean, homey restaurant. This is a praiseworthy effort and we hope that in later periods Joe will find this to be a good business investment also.

What They Laughed at 27 Years Ago

(A page from Engineering and Contracting of Nov. 3, 1915)

The Lighter Side of Engineering and Contracting

Thanks to the Periodical Spree.

A TUNNEL contractor who secured a contract for a long railroad tunnel in Arizona experienced considerable trouble with his contract. The first month revealed the work was carried on at a loss of $5,000. The second month indicated a still greater loss. His chief office accountant stationed on the job had furnished the contractor with monthly cost sheets for the two months' work with glaring figures in the "Red." The contractor urged that the third month's report must show up entirely in the "Black." However, the head tunnel foreman informed the accountant a loss would be evident again. In the meantime an old superannuate of the contractor's, in charge of the commissary, went on one of his periodical sprees. He invaded the commissary in search of alcoholics, drinking all of the lemon extract in stock; then, proceeding into the accountant's office, he made way with all the red ink. The next day he landed in the camp hospital with a full-sized case of the D. T.'s. The monthly reports were just being closed out, but no red ink was available to show the results of the work. The reports reached the contractor rendered entirely in the "Black." He was very much elated that the work was finally being performed at a profit. However, several days later a letter followed, explaining the discrepancies were not properly shown, as there was no red ink in the camp to indicate the true reflections of the figures.—C. A. E., Los Angeles, Cal.

The Bluff that Failed.

PAT was a new man in camp. Saturday night the boys were lined up to the bar and just as Pat poured his whiskey a "friend" yelled, "Fire out in front." Pat ran to the door, looked out and returned. His whisky was gone! Pat ordered another. "Man dropped dead," yells another "friend" rushing in through the door. Pat satisfied his curiosity and found on his return that his liquor had again disappeared. "Some joker," says Pat, "but I'll fool em, if they ever spring that trick on me agin." Pat called for his drink and then wrote on a card, "I spit in this glass," and placed the card over the well filled tumbler. Pat walked to the door in response to another "call" and returned. He lifted the card and was about to "partake" when he spied beneath his own warning the uncertain scrawl of some "friend"—"So did I."—H. J. F., Chicago.

Why the Farmer Climbed the Fence.

THE owner of the first automobile in Richmond, Ky., was driving through the hills at some distance from town one day when he noticed a farmer had stopped his horse a few rods in front and was looking very intently at the approaching car. In a moment the son of the soil jumped hurriedly out of the wagon, climbed over the rail fence and stood there. One of the occupants of the car went ahead to hold the horse while they passed. The horse did not seem at all concerned and while waiting for his friend to get in the driver remarked to the farmer: "Your horse didn't seem much afraid. Guess he never saw an automobile before." The farmer replied, "He hain't got nothing on me. I never did either."—A. P. R., Chicago.

Well Meant Advice.

H. B. KIRKLAND, the Chicago concrete specialist, was waiting at the elevated railway station the other night. An inebriated individual had stood on the L platform and watched several trains pass when the colored gentleman who acted as janitor and general platform scavanger finally became interested and approaching the swaying man said, "If yo' all is planning to go somewhere, you bettah get on the train. Dis yere platform don' go no where, it jus' stays right yere all the time. Yo' got to take de train to go anywhere!" The man took the next train.

The Long and Short of It.

MIKE GRADY, the sewer contractor, at one time had in his employ two Irishmen who, on account of their size, were nicknamed the long and short of it. One of them was some inches over 6 ft. in height while the other was not much over 5 ft. One day these two men were trenching for a sewer line. The foreman noticed that one of them was handling a great deal more dirt than the other. So he yelled at the big fellow: "Look here, Pat, how is it that little Johnnie Fallon, who is only half as big as ye, is doing twice as much work?" Pat looked at the diminutive Johnnie and then replied: "Faith why shouldn't he, ain't he nearer to it?"

"Seein' Things."

A NORTHERN contractor specializing in levee work invaded Southern territory. He succeeded in obtaining several good contracts in Louisiana, one of them requiring that a large job be undertaken during August. The contractor found the sultry atmosphere along the "Old Mississippi" almost unbearable and one hot August afternoon while cherishing within his mind James Whitcomb Riley's old poem, "The Old Swimmin' Hole," he inquired of Sam Jackson, a colored levee worker, where he could enjoy a good swim. Sam showed him a secluded swamp-like pond in the nearby timbers. The contractor said, "Well, Sam, this pond must be free from snakes." "Yass suh, Boss," replied Sam, "Der's many snake in dat hole." The contractor after enjoying his swim returned to the camp much refreshed. Sam immediately inquired of his Boss how he enjoyed himself. "Immensely," replied the contractor. "And I never saw a single snake. But, Sam, what was all those black logs floating around in the pond." Sam, snickering, replied, 'O'h, dem's only alligators, Boss, dey feeds on snakes. Dat's why you neber seen any."—C. A. E., Los Angeles, Cal.

Good Bait Anyway.

THE following story was told at a recent informal meeting of engineers at Richmond, Va.:

A man in North Carolina, who chose to do a day's work occasionally to secure booze while his wife toiled to support him, wandered off one day, fell in a stream, and was drowned. After several days' searching and dragging the river, his body, with catfish clinging tightly to his toes and fingers, was found and brought ashore. Shortly after his wife arrived at the scene. With arms akimbo she viewed the body some time, then said: "Bring the fish on up to the house and set him again."—S. E. R., Richmond, Va.

Safety First.

A WELL known consulting engineer of New York City was colonel of a Pennsylvania regiment during the civil war. In one of the battles he noticed that an Irish private stuck very closely to him. Finally impelled by curiosity he had the soldier brought before him. "Dugan," began the officer, "you've stood by me nobly this day." "Yis, sor," replied Dugan, saluting. "Me ould mother sez to me: 'Me boy, stick to the colonel and ye'll be all right; thim colonels niver get hit.'"

Otherwise a Perfectly Good Mayor.

THE mayor of an important Indiana city was recently impeached. Thirty-five charges were brought against him including: Misuse of city funds and city property, padding the city payroll, extortion of money from city employes for private use, non-payment of debts, excessive use of liquor, making false charges against aldermen, bringing liquor and causing liquor to be brought into the city hall, possession of immoral and corrupt traits of character, drunkenness, tax dodging, and bearing a bad reputation for truth and veracity. This miscreant even levied tribute against the Jitney Drivers' Union.

Skinner Mulvey says: I'm going back to Red Eye for old home week. They're advertising as a special attraction a total eclipse of the sun. The man who always says I can't is about as useful as a clock without hands.

Cutting Traffic Divider Line

NINE miles of traffic divider line have been cut out recently on the Grand Central Parkway. Long Island, New York. In order to insure a true line of cutting, the contractors, the Concrete Cutting Corporation of America, devised a line cutting machine by attaching a framework supported by four rails to one of their "Junior" rapid pavement breaker machines, which is air motor driven. As it was not necessary to use the pneumatic hammer, this was removed from the boom, as shown in Fig. 1.

This device being geared down to a speed of ¼ mile an hour gave a very steady and constant movement of the machine. Two men stand on the framework in front of the machine holding the usual type pavement breaker equipped with chisels. These chisels pass down through slotted bars, which are set at the required width of the trench. These bars are also adjustable to different widths of trench.

Fig. 1

Fig. 2

Fig. 3

The result of the line cutting for an 8-hour day was 10,000 lin. ft. of double-line approximately ⅜ in. deep.

In order to insure accuracy of this line, the frame carrying the two men is guided by a hinge disc which runs in the center expansion giving alignment to the work done. Upon checking on these lines it was found that they did not vary ⅛ in. one way or the other.

After the line had been cut a large rapid pavement breaker was used to break down the center of the trench leaving an approximate 4 in. of material inside of the line to be trimmed off by the gun method. This was followed by the gun crews and finished off on the line, as shown in Fig. 2.

As the traffic divider had to be tied down to the existing steel, it was necessary then that the excavating crew remove all of the material down to the reinforcing bar, as shown in Fig. 3. Then the bar was bent back in order that the large machine, as shown in Fig. 3, could go through and stir the concrete in order that it could be lifted out, as shown in Fig. 4.

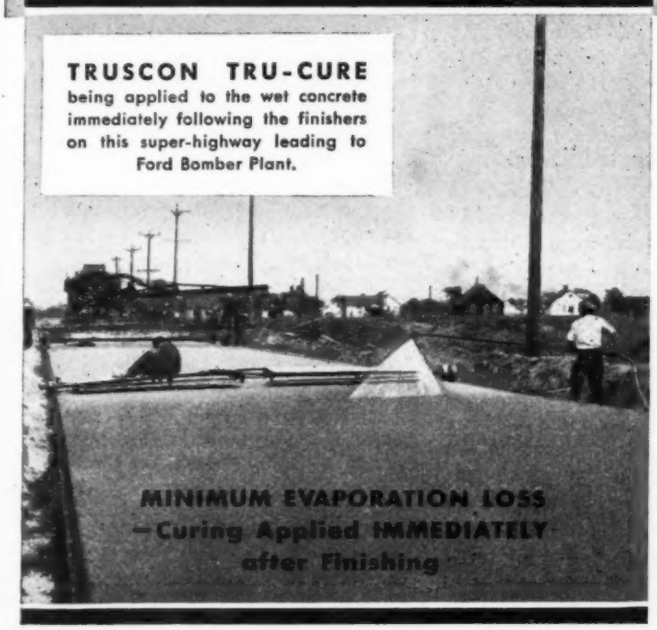
By the use of two men on the large machine and three men on the line cutting machine and one compressor man driving the truck that supplied the line cutter and with six gun men trimming, this crew accomplished an average of 1200 lin. ft. per day in the breaking out of this trench.

Fig. 5 shows the line cutting completed, ready for the breaking which prevented any spoiling beyond the line of cut and gave a very fine edge to be followed by the concrete layers.

Fig. 4

Fig. 5

96% Water Retention
(FIRST 24 HOURS AT 100° F.)
INSURES *better* CONCRETE



Why? Because the Physical Properties of Concrete Depend upon the Thoroughness of the Chemical Reaction between Cement and Water.

The quality of concrete is measured by the physical elements of hardness, strength, wearing surface, freedom from cracks and crazes. But since these physical properties result from the thoroughness of the chemical reaction between cement and water, concrete must retain its water until this chemical reaction is complete. Water is as essential a component of concrete as cement. If chemical reaction is incomplete because water is not continuously present, hardness, strength, wearing surface, etc., are impaired.

Also, if concrete dries out too rapidly, it shrinks through colloidal contraction and checking, cracking and crazing result. If, however, concrete holds its moisture the required length of time, the chemical reaction continues. And sufficiently high tensile strength is established so that when the water finally evaporates and the colloidal shrinking occurs, the concrete has adequate tensile strength to resist the cracking and checking from this shrinkage.

TRUSCON *TRU-CURE*

THE MODERN *Streamlined* METHOD OF CURING CONCRETE

TRUSCON TRU-CURE—applied by brush or spray—provides practically the equivalent of a 14-day water cure without further expense, labor, or supervision once it is applied. It is a clear or light-colored liquid. Contains no waxes, oils, asphalt, tar or pitch. Does not absorb heat and has a 24-hour water retention factor of better than 96%. With Tru-Cure there is no time lapse between finishing and the start of curing. The curing is applied immediately after finishing. Eliminates those first few hours water loss, thereby insuring better concrete—concrete that lives up to the most rigid specifications. Also saves time, labor and material.

In concrete road-building TRUSCON TRU-CURE eliminates the necessity for curing materials such as bags, paper, cotton mats, burlap. Also the need for heavy or bulky curing equipment, hauling of dirt, etc., and the expense of removing and cleaning up later.

Write for Literature on TRUSCON TRU-CURE Today to Dept. R-1

TRUSCON LABORATORIES
DETROIT, MICHIGAN

EDITORIAL

Gas Rationing and Tire Saving . . .

MOTORISTS in the Eastern States will have to get along on 16 gal. of gasoline a month, after July 22, when the rationing plan goes into effect. All owners of private automobiles will be given a basic "A" ration book containing a year's supply of 48 coupons, each coupon being good for 4 gal. of gasoline.

In order to obtain any supplemental ration through a "B" or "C" book, an applicant will be required to show that the "A" book will not meet his occupational driving needs.

The office of Price Administration has carefully figured out that the basic ration of 192 gal. per year, allowing 15 miles to the gallon, will provide 2880 miles of driving annually. Of this total OPA considers that 1800 miles will be available for occupational use and the remaining 1080 miles for general purposes, such as driving necessary to attend church, to take children to and from school and for shopping.

It is quite evident that all the touring most eastern motorists will do this summer will be from the home to the grocery store or to the post office.

The enforced curtailment of gasoline consumption in the eastern states is the direct result of a shortage of transportation facilities due to the war. In this connection it may be interesting to point out that with tanker service cut out it has been necessary to secure a gasoline supply from the west mainly by means of railway tank cars. It takes four trains each of 70 tank cars, to hold as much gasoline as would be handled in one tanker.

Gas rationing for the rest of the United States is now more than a possibility. It was hoped that enough scrap rubber could be collected to at least postpone this. But results of the early days of the campaign were so disappointing that it was extended for 10 days. until July 10.

Here in the middle west, at least, there is no scarcity of gas nor lack of means for transporting it. Then why should rationing be necessary? We are told that it is to conserve the tires of our cars. Some car owner may inquire: why is anyone so interested in my tire? Why should they care whether I wear them out in 6 months, or 9 months or a year? Perhaps a survey conducted recently by the Public Roads Administration at a West Virginia Ordnance Plant may shed a little light on this question.

The study revealed that a crisis in the transportation of the plant's workers was drawing near. Officials of the Public Roads Administration regard the situation at this plant as symtomatic of conditions elsewhere. On the basis of the West Virginia investigation and reports received from other sections, they believe that a worker-transportation crisis is developing on a nation-wide scale.

The West Virginia study brought out that about 300 automobiles now transporting more than 500 workmen to and from the ordnance plant will be laid up for lack of tires after less than 3,000 more miles of travel. Another 100 cars will be forced off the road within 6,000 more miles, and another 200 within 10,000 more miles. These 600 cars—about two-thirds of those in use at the plant—are now furnishing transportation for about 1,100 men or a third of the plant personnel. There are no other ways of transporting workmen to the plant after these cars are laid up for lack of tires.

Join the Contractors and See the World . . .

TIME was when most contractors stayed at home. They worked in their own state where they were familiar with labor and material conditions. Occasionally, they went into an adjoining state for lettings of particularly desirable contracts.

Of course, there always have been American contractors who specialized in work outside the boundaries of the United States. Hebbard of New York has for many years confined most of his highway building to South America, working principally in the Banana Republics. The Ulen Co. carried out many important construction operations in the far away places of the world, one a job involving the building of a 450-mile railroad to the Persian Gulf, which is now an allied supply line to Russia. Warren Bros. built an extensive highway system in Cuba. The J. G. White Co. had in one year construction operations under way in five continents, Europe, Asia, Australia, North and South America. The nearly 100 projects involved had an approximate value of $70,000,000. This was in 1907, when millions meant real money.

In recent years, however, contractors have been more inclined to leave the confines of their native states. When Mississippi started its extensive highway construction program, contractors from many states, particularly the middle west flocked down there. When the Pennsylvania Turnpike was built, outside contractors had many contracts. Some contractors even left the sacred precincts of the New England States to work on the Turnpike. However, contractors seldom went outside the boundaries of the United States.

But with the outbreak of World War II conditions have changed.

American contractors are now working in the far flung corners of the world. They are building roads in Iran, they are working wherever the army and navy has established its bases. They built the American air bases in Brazil and at Dutch Harbor, and the army base as Londonderry in North Ireland. Wherever there is a construction job to be done for the armed forces of the United States American contractors are doing it.

American contractors had their construction outfits at Guam and Wake Islands when the Japanese captured these places. At Guam 1100 construction workers were taken prisoners and at Wake Islands 300 men were captured. We wonder if the contractors for the Guam and Wake Island jobs included this item as an "unforseen contingency" in their bids.

We all know the famous saying "The Marines Have Landed and The Situation Is Under Control," but in this global war wherever the marines have set foot on shore they usually have found some American contractor's outfit already there.

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NORTH CAROLINA

(As of May 15, 1942)

S. T. Usry, Sr. Res. Engr., Army.
H. D. Dorsey, Jr. Res. Engr., Army, 1st Lieutenant.
C. R. Smith, Sr. Office Engr., Army, Captain.
J. S. Armstrong, Instrumentman, Army, Captain.
R. B. Lane, Instrumentman, Army, Private.
L. E. Whitfield, Jr., Instrumentman, Army, 2nd Lieutenant.
J. A. Cherry, Sr. H. Inspector, Army, Private.
W. W. Prescott, Sr. H. Inspector, Army, Corporal.
E. M. Finison, Jr. H. Inspector, Army.
L. C. Hubbard, Jr. H. Inspector, Navy, Ensign.
H. S. McDonald, Jr. H. Inspector, Army.
W. F. Wooley, Jr. H. Inspector, Army.
N. J. Blue, Rodman, Army.
C. Britt, Rodman, Navy.
W. Brooks, Rodman, Army, Corporal.
J. P. Brown, Rodman, Army, Private.
J. C. Buie, Rodman, Navy.
C. M. Castevens, Rodman, Navy.
W. E. Hawkins, Jr., Rodman, Army, Corporal.
D. F. Hinnant, Jr., Rodman, Army, 2nd Lieutenant.
H. C. Jackson, Rodman, Army.
W. A. Powell, Rodman, Army, Captain.
F. B. Rankin, Rodman, Army, 2nd Lieutenant.
J. E. Revis, Rodman, Army, Corporal.
T. O. Rumley, Rodman, Army, Private.
T. V. Staton, Rodman, Army.
I. E. Strickland, Rodman, Army, Private.
D. O. Turner, Rodman, Army, Corporal.
R. M. Walker, Rodman, Navy.
O. H. Borum, Sr. Lab. Technician, Army, 1st Lieutenant.
W. H. DeBoy, Jr. Lab. Technician, Army, 1st Lieutenant.
F. W. Graves, Jr. Lab. Technician, Army, 1st Lieutenant.
B. A. Hildebrand, Jr. Lab. Technician, Army, 2nd Lieutenant.
W. R. Middleton, Jr. Lab. Technician, Army, 1st Lieutenant.
L. R. Parsons, Jr. Lab. Technician, Navy, Ensign.
C. G. Stephens, Jr. Lab. Technician, Army, Cadet.
C. L. Smith, Sr. H. Inspector, Army, Private.
F. W. Pittman, Jr. H. Inspector, Army, Private.
C. R. Penny, Jr. Quarry Inspector, Army, Corporal.
G. T. Stevens, Jr. Quarry Inspector, Army, Captain.
E. L. Sielaff, Jr. Draftsman, Army, Private.
J. P. Dodge, Sr. Claim Adjuster, Army, Major.
I. Hardesty, Jr. Claim Adjuster, Army, Captain.
T. E. Spencer, Transitman, Army, Candidate.
J. R. Wilson, Asso. Construction Engineer, Navy, Lieutenant.
M. S. Howell, Chief of Party, Army, Private.
H. C. Townsend, Chief of Party, Army, Private.
W. B. Baker, Levelman, Marines, Private.
N. W. Lopez, Levelman, Army, 2nd Lieutenant.
S. C. West, Levelman, Army, 2nd Lieutenant.
S. O. Ingram, Jr., Instrumentman, Army, 2nd Lieutenant.
B. C. Beckwith, Rodman, Army, Candidate.
C. M. Holland, Rodman, Army, Private.
H. W. Shelden, Designer, Army, Major.
J. O. Litchford, Sr. Office Engineer, Army, Private.
J. H. Benton, Jr. Draftsman, Army, Cadet.
E. A. Harling, Jr. Draftsman, Army, 1st Lieutenant.
T. F. Jackson, Jr. Draftsman, Army, 2nd Lieutenant.
L. D. Murphy, Jr. Draftsman, Army, 2nd Lieutenant.
A. T. Strickland, Jr. Draftsman, Army, 1st Lieutenant.
I. M. White, Jr., Drafting Aide, Army, Cadet.
R. V. Rivenbark, Jr. File Clerk, Army, Sergeant.
C. R. Browning, Jr. Statistical Clerk, Navy, Designing Engr. School.
J. W. Marshburn, Party Chief, Navy, Reserve.
E. H. Crowell, Jr. Draftsman, Army, 1st Lieutenant.
C. Stein, Jr. Draftsman, Army, 1st Lieutenant.

SOUTH DAKOTA

D. M. Caldwell, Chainman, Army.
I. H. Colby, Traf. Superv., Captain, Infantry.
R. D. Cowan, Computer, 2nd Lieutenant, Field Artillery.
J. D. Dyson, Statistician, 2nd Lieutenant, Q.M.C.
R. Ellis, Chainman, Army.
L. W. Fargen, Inv. Superv., 2nd Lieutenant, Field Artillery.
H. Fetzner, Inspector, Army.
D. Gladstone, Chainman, Army.
R. Halla, Rodman, Army.
A. Hanson, Checker, Navy.
E. T. Johnson, Office Clerk, Army.

H. Lampy, Inst. Man, Sergeant, Sig. Corps.
H. H. Mole, Mgr. State Wide Highway Planning Survey, Major, Engr's.
G. N. Morgan, Sr. Draftsman, 1st Lt., Infantry.
H. B. Penne, Conc. Inspector, Naval Air Service.
O. E. Petrich, Checker, Army.
H. F. Pettyjohn, Rodman, Sgt., Field Artillery.
R. Price, Inspector, Naval Reserve.
E. Ramsell, Jr. Engineer, Army.
H. C. Rempfer, Res. Engr., Capt., Infantry.
K. Rock, Chainman, Army Aviation Cadet.
M. L. Ruffcorn, Chainman, Army.
R. Ryan, Rodman, Army.
E. V. Schuldt, Checker, Army.
K. R. Scurr, Bridge Engr., Lieutenant Colonel, Field Artillery.
H. H. Severson, Inst. Man, Army.
E. Sieger, Rodman, Army.
M. Stolley, Inspector, Navy.
J. Suiter, Jr., Analyst, 2nd Lieutenant, Infantry.
R. Thoreson, Draftsman, 2nd Lieutenant, Q.M.C.
C. S. Tompkins, Jr. Res. Engr., Captain, Engr's.
A. C. Trapp, Rodman, Army.
R. O. Zimmerling, Draftsman, Captain, Engr's.

TENNESSEE
(As of April 20)

J. R. Abel, Rodman, Army.
C. L. Adams, Resident Engineer, Army, 1st Lieutenant.
N. C. Barton, Loadometer Recorder, Navy.
C. Blair, Jr. Designer's Assistant, Navy.
C. Blackley, Plant Inspector, Army.
H. E. Blakeley, Bridge Draftsman, Nat. Guard, Captain.
C. H. Bolen, Rodman.
J. G. Brown, Rodman, Army.
L. Bruce, Inspector, Army.
R. Clover, Rodman, Army.
C. A. Cobble, Sr. Rodman, Army.
C. E. Colvin, Jr. Lab. Assistant, Naval Air Corps.
J. R. Cox, Instrumentman.
O. K. Everette, Rodman, Navy.
A. H. Ewing, Res. Materials Engineer, Army.
R. L. Forrester, Jr., Rodman, Army Aviation.
C. H. Fort, Jr., Rodman, Army.
J. H. Gilbert, Sr. Resident Engineer, Navy, Lieutenant-Comm.
J. M. Gillespie, Rodman.
F. M. Hill, Jr., Chemist, Naval Reserve.
R. E. Jacob, Jr. Engineer.
W. B. Kline, Sr. Rodman.
L. Kornman, Jr. Designer's Assistant, 181st Coast Art., Sergeant-Major.
W. H. Looper, Rodman, Army.
W. C. Long, Assistant Engineer Analyst, 181st Field Art., Major.
T. C. McEwen, Engineer-Director of Research, Army, Lieutenant-Colonel.
W. F. McMichael, Party Chief, Army.
M. C. McNellis, Rodman.
J. R. McRee, Jr. Engineer, Army.
W. Martin, Rodman, Army.
L. Mitchell, Rodman, Army Reserve, 1st Lieutenant.
W. H. Puryear, Rodman.
W. H. Rowan, Chief Soils, Naval Reserve.
W. A. Russell, Jr. Draftsman, Army.
C. H. Simpson, Rodman.
J. R. Smith, Coder, Army Air Corps.
F. Steele, Rodman, National Guard.
J. Stevens, Rodman, Army Air Corps.
R. W. Summers, Recorder, 181st Field Art.
J. B. Wilee, Jr. Materials Engineer, Army.
H. S. Winford, Jr. Designer, National Guard, Captain.
H. T. Woyton, Bridge Designer, Army, Major.

WISCONSIN
(As of April 20)

C. E. Richardson, Junior Chemist.
L. B. Gilbert, Assistant Highway Engineer.
F. M. Balsley, Junior Engineering Aide.
F. G. Kuether, Junior Assistant Highway Engineer.
W. B. Markowski, Senior Engineering Aide.
B. O. Henderson, Senior Assistant Highway Engineer.
O. J. Hughes, Senior Assistant Highway Engineer.
D. E. Gaffney, Senior Engineering Aide.
L. T. Cockrell, Engineering Aide.
S. C. Stellpflug, Engineering Aide.
H. W. Kollmeyer, Engineering Aide.
W. R. Krieger, Junior Draftsman.
C. W. Rollman, Senior Engineering Aide.
H. C. Schlueter, Junior Assistant Highway Engineer.
H. J. Stehling, Senior Engineering Aide.
D. A. Madigan, Assistant Photographer.
N. F. Wendt, Senior Engineering Aide.
C. L. Towers, Engineering Aide.
F. J. Meinhardt, Jr., Semi-Skilled Laborer.
R. C. Nancolas, Senior Engineering Aide.
C. D. Warren, Senior Clerk Stenographer.
H. A. Amadon, Senior Engineering Aide.
S. E. Hicks, Assistant Highway Engineer.
R. N. Jackson, Junior Assistant Highway Engineer.

MISSOURI
(As of May 13)

M. Ableman, Associate Engineer, Army.
R. Adams, Senior Engineer, Army.
T. Austin, Engineer Assistant, Army.
G. Bartholomaeus, Engineer Assistant, Army.
J. Blackburn, Mechanical Foreman, Army.
J. Bergman, Junior Engineer, Army.
C. L. Bower, Senior Engineer, Army.
E. R. Cartmill, Engineer Assistant, Army.
D. J. Colyer, Senior Engineer, Army.
R. H. Cooley, Junior Engineer, Army.
L. Corder, Associate Engineer, Navy.
H. M. Cutler, Junior Clerk, Army.
J. R. Davison, Engineer Assistant, Army.
H. E. Dudley, Junior Engineer, Army.
B. R. Dunwiddie, Associate Engineer, Army.
E. Grubb, Associate Engineer, Army.
T. G. Haake, Engineer Assistant, Army.
F. Haines, Junior Engineer, Army.
M. Hall, Associate Engineer, Army.
H. W. Holliway, Junior Engineer, Army.
F. Hon, Junior Clerk, Navy.
L. B. Howard, Engineer Assistant, Army.
M. F. Kennedy, Engineer Assistant, Army.
L. Lozier, Assistant Attorney, Army.
R. Markway, Engineer Assistant, Army.
J. I. Marsh, Junior Clerk, Army.
J. E. Matthews, Senior Engineer, Army.
T. G. Morton, Junior Engineer, Army.
F. H. Newkirk, Foreman, Army.
E. A. Palmer, Patrolman, Army.
N. W. Remley, Associate Engineer, Army.
B. Rowland, Engineer Assistant, Army.
V. Schroeder, Junior Engineer, Army.
J. W. Sheetz, Junior Engineer, Army.
P. H. Sommers, Associate Engineer, Army.
H. W. Spenny, Junior Engineer, Army.
J. C. Tate, Associate Engineer, Navy.
W. W. Terrell, Engineer Assistant, Army.
W. O. Thomasson, Junior Engineer, Army.
E. L. Turbyfill, Junior Engineer, Army.
C. C. Wilkinson, Junior Engineer, Army.
O. V. Williams, Engineer Assistant, Army.

TEXAS
(As of April 27)

J. L. Worthington, Technical Asst., Captain, Q.M. Corps.
E. H. Alsup, Senior Office Asst., 1st Lt., Army.
W. W. Barnes, Jr., Asst. Bridge Des., 1st Lt., Engr. Res.
C. L. Boyd, Recorder.
A. R. Bagley, Laboratory Asst.
G. W. Black, Jr., Party Chief.
M. E. Burkhart, Accounting Clerk.
J. T. Barton, Financial Manager, Lt., J.G., U.S.N. R.
H. R. Clewis, W.P.A. Contact Engr., Captain, Army.
A. H. Clopton, R. I. District Sup't., Army
J. W. Cox, Jr. Laboratory Asst.
J. V. Doriat, Party Chief, Reserve Officer.
M. C. Duncan, Clerk.
J. R. Graves, Asst. Bridge Des.
E. K. Gay, Accounting Clerk, Army.
L. Hoffman, Sec., Commission.
J. M. Jordan, Field Supervisor, Major, Army.
V. F. Krejci, Reproduction Asst., Army.
H. H. Kovarsky, Draftsman, Army.
J. R. Mitchell, Recorder.
G. S. Meyer, Engineer Design.
S. S. Minot, Recorder.
F. H. Newman, Jr., Soils Engineer, Major, Engrs.
E. A. Oualline, Jr., Jr. Survey Analyst.
A. H. Pollard, Special Lab. Engr.
F. W. Perrin, Jr. Office Asst., 2nd Lt., Engrs.
W. Reaves, Jr. Survey Analyst.
E. H. Staples, Asst. Bridge Draftsman, 1st Lt., Q.M. Corps.
A. L. Sentz, Asst. Bridge Designer, Army Air Corps.
A. W. Smith, Laboratory Asst.
C. Stephenson, Asst. Mimeo. Clerk.
B. A. Trice, Jr. Designs Engr., Captain, Army.
B. T. Taylor, Recorder.
A. L. Talley, Filing Clerk.
R. W. Townsley, Jr. Title Examiner.
J. R. Van Ness, Sr. Survey Analyst.
A. T. Wolfe, Recorder.
C. A. Walker.
T. E. Wilson, Nail Picker Op.
R. J. Mueller, Jr., Sr. Lab. Asst., Reserve Officer.
R. R. Sartain, Instrumentman.
W. P. Cornelius, Jr. Resident Engr.
J. E. Carpenter, Junior Inspector.
J. D. Harris, Jr., Checker.
A. E. Koch, Instrumentman.
W. L. Stockton, Field Engineer.
J. N. Stinson, Jr. Office Asst.
F. C. Miles, Checker, Nat'l Guard.
J. M. Bingham, Jr. Inspector.
R. W. Crook, Field Engineer.
W. J. Doane, Construction Supt., Navy.
W. B. Frazier, Rodman.
M. H. Green, Checker.
B. T. Hillis, Jr. Office Asst.
R. R. Harris, Sr. Office Asst.
H. R. Pipkin, Resident Engineer.
G. M. Spiller, Checker, Nat'l Guard.
H. Lawrence, Jr., Com. Lab. & S.L.
O. Denham, Common Laborer.
T. Frazier, Jr., Field Engineer.
H. E. Meisell, Field Engineer, Army.
S. Porterfield, Laborer.
W. W. Potter, Jr. Inspector.
D. H. Rose, Sr. Office Asst., 2nd Lt., Army.
D. W. Boner, Checker, U. S. Navy.
G. Cannon, Jr., Rodman.
A. K. Dixon, Typist.
W. F. Frey, Jr. Resident Engr.
C. E. Garrison, Checker.
G. Schuhart, Jr. Office Asst.
A. F. Reese, Jr., Checker.
C. N. Bellamy, Rodman.
H. Harrison, Permit Clerk.
E. J. Willson, Dist. Maint. Engr., Captain.
V. J. Williams, Checker.
H. M. Anderson, Jr. Office Asst., Reserve Officer.
J. F. Cole, Checker.
W. P. Fulgin, Checker.
H. J. Grebing, Jr., Rodman.
D. Jones, Rodman.
T. J. King, Rodman.
T. Morgan, Jr., Rodman, Army Air Corps.
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J. P. Coppinger, Rodman.
R. E. Denison, Instrumentman.
R. L. Stephenson, Junior Office Asst.
M. Teinert, Rodman.
J. H. Aiken, Jr. Res. Engr., Reserve Corps.
A. C. Bates, Jr., Junior Inspector.
W. J. Kaiser, Checker, Army.
J. P. Ledbetter, Rodman, Reserve Officer.
E. P. Meyers, Junior Inspector.
H. K. Moffett, Checker, Reserve Officer.
N. Shane, Rodman.
M. A. Schrank, Junior Inspector, Reserve.
R. T. Smith, Field Engineer, Reserve.
H. Zacharias, Rodman.
K. F. Elliott, Office Engineer, Army.
H. L. Arvo, Jr. Res. Engr., Reserve Officer.
F. Barber, L.W.R. Foreman, Army.
R. W. Fuller, Field Engineer.
J. B. Hoffman, Checker.
R. Johnston, Jr. Office Asst., Army.
D. R. Ketley, Jr. Inspector.
H. I. Myers, Jr. Inspector, Navy.
C. Spinks, Utilityman.
P. O. Mayberry, Sr. Inspector.
M. L. Green, Dist. Office Clerk, Army.
C. H. Jones, Jr., Rodman.
H. H. McCord, Sr. Office Asst., Reserve Officer.
H. W. Brennon, Jr., Instrumentman.
P. R. Burton, Rodman.
W. A. Burks, Jr., Junior Insp., Army.
T. R. Francis, Instrumentman, Cadet, U. S. Air Corps.
J. E. Gaston, Special Engr.
W. J. Gise, Rodman.
F. Geron, Sr. Inspector, Army.
G. P. Cook, Jr., Field Engr., Army.
J. E. Hollub, Rodman, Nat'l Guard.
W. L. Haynes, Junior Insp.
H. Hughes, First Deck Man.
L. C. Hoskins, Chainman.
L. F. Lowry, Instrumentman.
W. C. McMurrey, Jr. Res. Engr.
J. C. Morton, Ticket Agent.
D. A. McCall, Rodman.
P. Mabry.
W. H. Synnot, Sr. Office Asst., Army.
V. E. Woodard, Field Engineer, Reserve Officer.
E. J. Effenberger, Field Engineer.
R. W. Barnes, Rodman.
H. L. Helble, Junior Inspector, Engrs.
W. H. Hiatt, Instrumentman.
G. B. Mueller, Checker.
R. E. Rinn, Dist. Bookkeeper.
W. Romberg, Rodman, Army.
C. E. Tolhurst, Junior Inspector.
D. L. Wasserman, Rodman.
C. H. Word, Jr. Resident Engr., Army.
V. C. Le Clerg, Field Engineer, 1st Lt., Reserve Officer.
A. J. Sherrod, Instrumentman, Lt. Engr. Res.
R. O. Cleveland, Jr. Office Asst.
C. C. Casparis, Const. Supt.
F. M. Fly, Field Engineer.
D. B. Granger, Rodman.
R. G. Kirk, Jr. Resid. Engr.
J. F. Loper, Junior Inspector, Reserve Officer.
D. McKeown, Rodman, Army.
J. Miles, Clerk, Navy.
F. Scrivner, Sr. Inspector.
E. P. Arneson, Jr., Instrumentman.
H. V. Fetzner, Rodman, Army.
R. Haas, Checker.
H. F. Hilgers, Resident Engineer, Res. Officer.
H. J. Koch, Rodman.
T. A. Kerr, Jr., Checker, Army.
W. H. Lowe, Bridge Watchman, Army.
T. E. Perrenot, Asst. Roadside Devel., Field Art.
R. B. Rodgers, Rodman, Q.M. Corps.
W. W. Scales, Jr. Office Asst.
F. A. Salmon, Rodman, Army.
J. P. Veerling, Sr. Roadside Devel.
H. J. Wylie, Sr. Office Asst.
A. Yourzick, Sr. Office Asst.
W. M. Wolf, Instrumentman, Flying Instructor.
O. D. Bridges, Instrumentman, 1st Lt., Engr. Res.
W. K. Coker, Instrumentman, Army.
A. H. Gregarcyck, Common Laborer, Army.
G. F. Gallagher, Common Laborer.
W. A. Gwin, Rodman.
C. H. Gilless, Rodman, Army.
K. L. Hames, Sr. Office Asst.
G. F. Hans, Army.
H. Krietsh, Com. Laborer, Army.
C. L. Landrum, Com. Laborer.
B. W. Rogers, Office Engineer, Army.
C. A. Sturrock, Field Engineer, Army Air Corps.
S. A. Steele, Jr. Resid. Engr., Army.
I. W. Sutherland, Sr. Inspector, Army.
B. Wray, Instrumentman, Res. Officer.
I. C. Byrd, Com. Laborer.
S. Brademan, Checker.
J. G. Hanover, Rodman, 2nd Lt., Coast Art.
A. L. Darley, Checker, Army.
R. M. Massey, Rodman.
D. M. Shannon, Sr. Inspector, Army.
R. S. Lockeet, Checker, Army.
F. W. Allen, Jr. Inspector.
F. W. Cawthon, Sr. Res. Engr.
M. W. Collie, Dist. Engr.
G. W. Cox, Field Engineer, Res. Officer.
B. F. Davis, Jr. Office Asst., Res. Officer.
C. W. Forrest, Sr. Office Asst., Army.
S. R. Greer, Jr. Res. Engr.
G. Huebner, Sr. Office Asst., Army.
W. C. Murphy, Jr. Office Asst., Navy.
R. S. McCormack, Checker, Army.
H. Patterson, Checker.
P. Reeves, Checker.
J. R. Taylor, Jr., Checker.
M. D. Wallace, Timekeeper.
J. T. Webb, Checker.
W. White, Jr. Office Asst.
A. W. Baker, Rodman.
J. H. Crawford, Sr. Office Asst., Army.
J. H. Henderson, Rodman.
F. C. Sandlin, Rodman, Army Reserve.
V. Y. Cain, Field Engineer.
P. H. Damrel, Checker.
H. E. Furry, Sr. Office Asst.
M. M. Henry, Instrumentman.
M. Norman, Rodman.
W. R. Pinkston, Jr. Lab. Asst.
R. J. Richey, Checker.
J. C. Herrera, Field Engineer.
R. R. Guerra, Senior Inspector.
N. Seago, Typist.
W. W. Statler, Clerk.
A. C. Volz, Field Engineer.
R. L. Buckley, Rodman.
G. F. Adams, Checker.
F. W. Clark, Jr., Instrumentman.
R. H. Duke, Jr. Office Asst.
C. N. Parsons, Jr. Resident Engr., Reserve Officer.
M. Peters, Rodman, Army.
J. R. Nales, Rodman.
N. R. Haynes, Jr. Office Asst.
E. Balkum, Jr. Office Asst., Reserve Officer.
W. W. Chaney, Checker.
H. M. Jones, Chainman, Army.
T. R. Karber, Patrolman.
P. Wheeler, Asst. Manager.
B. T. Griffin, Machine Opr., Army.
J. R. Mitchell, Recorder, Air Corps.
A. H. Christian, Jr. Res. Engr., Lieutenant.
C. Prewitt, Rodman, Army.
F. P. Ellis, Res. Engr., Army.
F. J. Peisker, Sr. Survey Anal., Army.
J. B. Jeffus, Field Engineer, Ensign, Naval Res.
L. Newsom, Utilityman, Army.
V. J. McGee, Jr. Res. Engr., 1st Lt., Field Artil.
R. O. Swain, Sr. Asst. Traf. Engr., 1st Lt., Engr.
G. Best, Field Engineer, Army.

CALIFORNIA

(As of April 22)

C. S. Ames, Junior Mechanical Engineering Draftsman.
H. Ayanian, Junior Highway Engineer.
F. M. Barnes, Associate Bridge Engineer.
M. R. Blacow, Junior Architectural Draftsman.
R. H. F. Boothe, Junior Bridge Engineer.
W. R. Borden, Junior Highway Engineer.
C. Bovey, Senior Engineering Aid.
C. J. Brownell, Associate Bridge Engineer.
J. R. Brummer, Junior Highway Engineer.
W. F. Bruning, Junior Highway Engineer.
W. J. Campion, Jr., Junior Engineering Aid.
T. J. Canini, Senior Engineering Aid.
A. H. Carver, Junior Engineering Aid.
J. R. Charle, Delineator.
F. Christensen, Under Engineering Aid.
W. W. Clark, Under Engineering Aid.
C. W. Clawson, Junior Highway Engineer.
M. Colodny, Senior Engineering Aid.
G. L. Coltrin, Senior Engineering Aid.
F. P. Cordero, Junior Bridge Engineer.
F. B. Cressy, Associate Highway Engineer.
C. E. Dalgleish, Senior Engineering Aid.
R. E. Deffebach, Junior Highway Engineer.
R. W. Douglas, Senior Engineering Aid.
D. F. Downing, Senior Engineering Aid.
G. H. Ebenhack, Junior Physical Testing Engineer.
E. C. Engle, Junior Highway Engineer.
K. M. Fenwick, Assistant Highway Engineer.
T. E. Ferneau, Associate Bridge Engineer.
J. H. Ferns, Junior Bridge Engineer.
F. L. Firebaugh, Assistant Highway Engineer.
J. R. Fisher, Senior Engineering Aid.
D. G. Fountain, Delineator.
P. Friedorff, Under Engineering Aid.
C. R. Gallagher, Junior Highway Engineer.
W. S. Geib, Junior Physical Testing Engineer.
R. J. Geimer, Junior Highway Engineer.
H. H. Gilbert, Senior Bridge Engineer.
W. D. Gossard, Junior Engineering Aid.
M. L. Gould, Under Engineering Aid.
G. H. Greenwood, Assistant Highway Engineer.
C. E. Habasque, Under Engineering Aid.
W. T. Haight, Associate Bridge Engineer.
R. J. Hatfield, Associate Highway Engineer.
T. P. Hawthorne, Assistant Highway Engineer.
R. V. Hayden, Junior Bridge Engineer.
R. S. Head, Junior Highway Engineer.
S. Helwer, Senior Engineering Aid.
F. J. Hillman, Under Engineering Aid.
R. Hon, Junior Highway Engineer.
H. H. Hoover, Junior Highway Engineer.
T. L. Howard, Assistant Bridge Engineer.
R. E. Huhs, Delineator.
R. W. Ilmanen, Under Engineering Aid.
P. Iwatsu, Senior Engineering Aid.
E. E. Jackson, Assistant Highway Engineer.
H. D. Johnson, Junior Highway Engineer.
J. L. Krause, Under Engineering Aid.
J. E. Kushner, Senior Engineering Aid.
W. E. Ladue, Junior Structural Engineering Draftsman.
E. F. Laflin, Junior Highway Engineer.
A. Lanker, Under Engineering Aid.
F. J. Leithold, Junior Highway Engineer.

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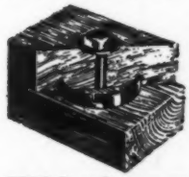

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O. L. Ligh, Junior Engineering Aid.
E. S. Longfellow, Junior Highway Engineer.
C. Maffia, Jr., Junior Engineering Aid.
P. A. Main, Junior Highway Engineer.
R. T. Martin, Delineator.
H. K. Mauzy, Assistant Highway Engineer.
J. E. McMahon, Associate Bridge Engineer.
L. T. McNamara, Assistant Highway Engineer.
J. T. McWilliam, Delineator.
F. A. Meier, Junior Engineering Aid.
M. Meizlisch, Junior Engineering Aid.
D. Miller, Assistant Bridge Engineer.
W. H. Mohr, Junior Highway Engineer.
H. L. Morian, Junior Bridge Engineer.
J. F. Mulgrew, Jr., Junior Highway Engineer.
R. P. Murphy, Junior Bridge Engineer.
E. J. Murray, Associate Bridge Engineer.
W. M. Nett, Junior Highway Engineer.
R. N. Nicholson, Senior Engineering Aid.
D. Noguchi, Senior Engineering Aid.
H. Noguchi, Senior Engineering Aid.
C. E. Nuding, Junior Engineering Aid.
J. C. Obermuller, Senior Engineering Aid.
C. M. O'Donnell, Junior Highway Engineer.
J. O'Shea, Junior Highway Engineer.
L. D. Packard, Associate Highway Engineer.
S. Payson, Assistant Bridge Engineer.
L. S. Pierce, Junior Highway Engineer.
W. E. Pollock, Under Engineering Aid.
R. Queen, Junior Engineering Aid.
F. N. Roberts, Junior Highway Engineer.
M. B. Rowan, Junior Highway Engineer.
H. C. Rowe, Junior Highway Engineer.
W. W. Russell, Junior Highway Engineer.
E. H. Sagehorn, Junior Bridge Engineer.
V. M. Sayers, Senior Engineering Aid.
W. D. Sedgwick, Associate Highway Engineer.
E. A. Shafer, Junior Highway Engineer.
J. W. Shaver, Junior Highway Engineer.
D. Sheffield, Junior Highway Engineer.
J. W. Silliman, Assistant Bridge Engineer.
S. J. Smith, Under Engineering Aid.
J. A. Sonne, Junior Structural Engineering Draftsman.
W. Spirz, Junior Bridge Engineer.
F. H. Steele, Junior Engineering Aid.
J. G. Stephens, Junior Highway Engineer.
N. C. Stille, Junior Engineering Aid.
J. Sylvester, Junior Bridge Engineer.
E. T. Telford, Senior Highway Engineer.
R. D. Thorson, Associate Bridge Engineer.
R. A. Tudor, Principal Bridge Engineer.
F. E. Turpie, Senior Engineering Aid.
R. R. Vlach, Junior Engineering Aid.
C. F. Waite, Senior Highway Engineer.
G. Walters, Structural Engineering Office Aid.
L. Watt, Junior Highway Engineer.
E. C. Weaver, Senior Engineering Aid.
H. J. Webb, Junior Highway Engineer.
M. H. West, Junior Highway Engineer.
V. Whitmarsh, Junior Engineering Aid.
J. B. Wickham, Under Engineering Aid.
A. B. Willett, Associate Bridge Engineer.
H. Zook, Junior Engineering Aid.

NEW MEXICO
(As of May 14)

W. N. Foster, Cost Engineer, 200th Anti-Aircraft, Capt.
H. Jeffus, Computer, 200th Anti-Aircraft, Capt.
J. Sadler, Computer, 200th Anti-Aircraft, Capt.
T. Montoya, Bookkeeper-Clerk, 200th Anti-Aircraft, Lieut.
E. McLeod, Carryall Oper., 200th Anti-Aircraft, Pvt.
R. R. Sedillo, Asst. State High. Engr., State Selective Serv., Major.
J. P. Morgan, Asst. Test. Engr., Army, Capt.
M. J. Ogas, Office Engr., Army Signal Corps, Lieut.
J. C. Gerhart, Levelman, Cavalry, 1st Lieut.
R. E. Donohue, Const. Supt., Army, 2nd Lieut.
B. Shaffer, Soils Inspector, Army, Sgt.
C. Hogrefe, Asst. Field Mat. Engr., Army Air Corps, Sgt.
R. S. Young, Clerk, Coast Artillery, Corp.
B. B. Leyba, Truck Driver, Army, Pvt.
D. Russell, Laborer, Army, Pvt.
P. Porter, Patrol Foreman, Army, Pvt.
A. Stewart, Tractor Operator, Army, Pvt.
R. Acker, Truck Driver, Army, Pvt.
V. Runyon, Truck Driver, Army, Pvt.
G. Hines, Laborer, Army, Pvt.
V. Kennedy, Timekeeper, Army, Pvt.
J. H. Lee, Truck Driver, Army, Pvt.
K. Mortensen, Distributor Operator, Army, Pvt.
W. J. Jones, Bulldozer Operator, Army, Pvt.
G. Dillard, Tractor Operator, Army, Pvt.
P. Hanagan, Mechanic's Helper, Air Corps, Pvt.
R. Jones, Truck Driver, Army, Pvt.
Z. Jones, Truck Driver, Army, Pvt.
J. May, Truck Driver, Army, Pvt.
E. A. McLeod, Distributor Operator, Army, Pvt.
J. Montgomery, Shovel Operator, Army, Pvt.
O. L. Porter, Field Draftsman, Army Air Corps, Pvt.
M. Smith, Truck Driver, Army, Pvt.
H. Sims, Laborer, Army, Pvt.
O. Van Eaton, Truck Driver, Army, Pvt.
F. M. Clark, Rodman, Coast Artillery, Pvt.
G. Heller, Instrumentman, Army, Pvt.
E. B. Wade, Computer, Army, Pvt.
R. Furman, Rodman, Army, Pvt.
P. Padilla, Laborer, Army, Pvt.
H. I. Dalbey, Inspector, Army, Pvt.
C. Gallegos, Chainman, Army, Pvt.
C. M. B. Dysart, Truck Driver, Army, Pvt.
G. T. Thompson, Rodman, A.F.R.T.C., Pvt.
W. C. Zerwer, Soils Inspector, Army Engineers, Pvt.
E. L. Giles, Welder, Army Engineers, Pvt.
L. Brochero, Truck Driver, Army, Pvt.
I. Romero, Laborer, Army, Pvt.
L. Leyva, Truck Driver, Army, Pvt.
J. J. Abeyta, Motor Grader Operator, Army, Pvt.
J. Martinez, Rodman, Army, Pvt.
L. Varoz, Truck Driver, Army, Pvt.
T. Vicich, Cost Engineer, Army, Pvt.
J. Luchini, Cost Engineer, Army, 1st Lieut.
J. R. Hogan, Inventory Clerk, 2nd Reporting Co., Pvt.
L. Boles, Laboratory Assistant, Coast Artillery, Pvt.
J. Plese, Laboratory Assistant, Army Air Corps, Pvt.
J. Turner, Statistician, Army, Pvt.
R. H. Gaylor, Chief of Party, Army, Pvt.
G. H. Hook, Computer, Army, Pvt.
J. Nagle, Tracer, Army Air Corps, Pvt.
L. Floyd, Statistician, Army, Pvt.
E. R. Parr, Instrumentman, Army, Pvt.
C. Horne, Office Engineer, Army Air Corps, Pvt.
D. Sadler, Rodman, Army, Lieut.
H. Leslie, Asst. Project Engineer, Army, Lieut.
J. P. Sanchez, Computer, Army, Corp.
H. Jorgensen, Helper, Army, Pvt.
P. Barber, Helper, Army, Pvt.
M. Moss, Foreman, Army, Pvt.
D. Daniel, Painter, Army, Pvt.
J. Mitchell, Computer, Army, Pvt.

ARKANSAS
(Engineering Division only, as of May 12)

M. W. Kehart, Resident Engineer, Navy, Lt. Commander.
J. T. Pendergrass, Resident Engineer, Navy, C. E.
W. A. Spratlin, Instrumentman, Field Artillery, Lieutenant.
E. B. Badinelli, Resident Engineer, Eng. Corps, Major.
I. D. McMurray, Inspector, Air Corps.
D. Hopkins, Inspector.
H. C. Fields, Laboratory Asst., Army, 1st Lieutenant.
H. Treece, Draftsman, Air Corps, Sergeant.
H. Cooke, Draftsman, R. A. F., England.

IDAHO
(As of April 22)

F. E. Smith, Dist. Mat. Eng., Engineers, 1st Lieutenant.
R. J. Abbey, Laboratory Assistant, Infantry, 2nd Lieutenant.
G. A. Foulke, Chief Map Draftsman, Field Artillery, Major.
W. L. Morris, Draftsman, Engineers, 1st Lieutenant.
T. A. Downing, Asst. Chief Draftsman, Engineers, Major.
I. C. Long, Draftsman, Engineers, Lieutenant-Colonel.
F. F. Faires, Rodman, Field Artillery, 2nd Lieutenant.
W. Hooten, Draftsman, Field Artillery, 1st Lieutenant.
S. K. Burr, Chemist, Medical, Corporal.
H. L. Baker, Laboratory Asst., Air Corps, Cadet.
I. Sharp, Laboratory Asst., Infantry, Private.
P. DuSault, Resident Engineer, Quartermaster, Captain.
L. Reagan, Chainman, Field Artillery, Private.
D. Erdman, Chainman, Private.
G. Wendt, Chainman, Private.
H. Lyon, Laboratory Asst., Navy Air Corps, Ensign.
W. Vesser, Rodman, Field Artillery, 1st Sergeant.

ARIZONA
(As of May 12)

K. E. Adamson, Statistician, Army.
G. Ash, Chief Clerk, Navy.
P. E. Beverly, Patrolman, Army.
G. C. Boyer, Computor, Army.
R. Broan, Chainman, Army.
H. Brown, Maintenance, Army.
M. Y. Carpenter, Supervisor, Army.
R. Chambers, Mechanic's Helper, Army.
W. F. Chenoweth, Jr., Chainman, Army.
B. Clark, Chainman, Naval Air Corps.
F. N. Collins, Officeman, Army.
J. E. Cook, Laboratory Helper, Army Air Corps.
C. A. Davis, Estimator, Army Engineers.
R. L. Davis, Rodman, Army.
T. Easton, Rodman, Army.
M. Ebsen, Officeman, Army.
T. G. Elms, Clerk, Army.
W. U. Ewing, Radio Technician, Army Radio Div.
T. Hamblin, Maintenance, Army.
R. W. Harris, Officeman, Army.
W. H. Harrington, Rodman, Navy.
D. A. Hart, Maintenance, Army.
C. Hawley, Chainman, Army.
R. W. Hedges, Laboratory Helper, Army.
J. Hefner, Maintenance, Army.
F. Hughes, Stakeman, Army.
R. Hume, Jr., Maintenance, Army.
P. Johnson, Chainman, Army.
F. Keenum, Radio Operator, Army.
W. Lanford, Jr., Mail Boy, Army.
R. M. Lewton, Rodman, Army.
O. R. Lindstrom, Jr., Rodman, Army.
T. Lingo, Stakeman, Air Corps.
R. McCally, Clerk, Army.
W. C. Merrill, Laboratory Helper, Army.
B. W. Miller, Statistician, Army.
T. S. Mills, Maintenance, Army.
D. H. Ming, Mechanic's Helper, Army.
C. Nelson, Maintenance, Army.
J. A. Nord, Maintenance, Army.
T. H. Owens, Chainman, Army Air Corps.
T. Pierce, Maintenance, Army.
C. F. Pierson, Construction, Army.
A. Pinnell, Construction, Army.
P. Pouquette, Maintenance, Army.
O. Rainville, Inspector, Army.
W. P. Reeves, Inspector, Army.
T. Richards, Chainman, Army.
J. Rutherford, Rodman, Army Air Corps.
H. L. Samuel, Inspector, Army Air Corps.
W. Sheets, Patrolman, Army.

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V. J. Westley, Draftsman, Army.
P. Wiese, Construction, Army.
W. E. Willey, Draftsman, Army Air Corps.
D. J. Winn, Inspector, Navy Air Corps.
W. T. Wishart, Chief Designer, Navy Engr.
J. D. Wynne, Inspector, Army.

WASHINGTON
(Engineering Employees only as of April 22)

L. V. Murrow, Director of Highways, Lieut.-Col. in Air Corps.
M. P. Davidson, Maintenance Supervisor.
G. R. Huff, Rodman.
L. W. Cody, Laboratory Assistant.
J. B. Clark, Draftsman, Lieut., Coast Artillery.
L. M. Eng, Rodman.
W. M. Joselyn, Chainman.
W. E. Walker, Draftsman.
N. R. McKay, Dist. State Aid Engr., Lieut.-Col.
L. W. Pay, Chainman.
D. H. Williams, Chainman.
W. F. Kerns, Checker.
G. D. LeGro, Chainman.
J. E. Colwell, Inspector.
R. J. Urton, Chainman.
L. F. Jordan, Chainman.
J. R. Barber, Chainman.
E. R. Grosvenor, Draftsman.
E. R. Thompson, Chainman.
H. H. Chenoweth, Bridge Draftsman.
W. M. Leigh, Axeman.
R. R. Reagan, Chainman.
D. H. Harrold, Asst. Traffic Engineer.
J. M. Howard, Chainman.
W. H. Carsten, Inspector.

OREGON
(As of April 20)

H. Adams, Photostat Operator, Army, Captain.
R. D. Anderson, Assistant Engineer.
G. W. Bagnall, Machine Designer, Army, Lieutenant.
M. Beardsley, Draftsman.
C. I. Black, Laborer.
W. A. Black, Truck Driver.
C. A. Bonnett, Draftsman, Army, Lieutenant.
G. F. Bornstedt, Head Chainman.
F. J. Boulier, Sign Painter.
V. F. Busch, Weighmaster.
E. A. Calkins, Computor.
J. W. Cattrell, Bridge Draftsman.
R. N. Chase, Office Assistant.
A. J. Christiansen, Raker.
R. W. Corbett, Large Truck Driver.
W. L. Damerell, Head Chainman,
G. L. Danforth, Inspector.
C. Darby, Bridge Designer, Navy, Lieutenant.
F. L. Davidson, Rollerman.
D. D. Davis, Bridge Inspector.
L. P. Dixon, Timekeeper.
W. J. Dorner, Bridge Inspector.
R. Edgerton, Computor.
K. Flory, Computor.
L. W. Franklin, Resident Engineer, Army, Lieutenant.
H. F. Fryer, Apprentice Raker.
M. M. Fryer, Light Truck Driver.
D. G. Galloway, Large Truck Driver.
G. L. Gardner, Laborer.
J. E. Gately, Assistant Engineer, Grade 1.
A. L. Gidney, Pump Attendant.
R. W. Gilkey, Research Assistant.
V. E. Graue, Computor.
F. J. Hageman, Office Assistant, Army.
I. S. Hakanson, Laborer.
H. T. Harnes, Apprentice Raker.
H. V. Heim, Chainman.
G. C. Hester, Office Assistant, Army, Captain.
R. A. Higgins, Sign Painter.
P. D. Himmel, Head Chainman.
E. C. Jones, Foreman.
L. C. Jones, Truck Driver.
L. E. Jones, Head Chainman.
V. R. Jones, Assistant Engineer, Grade 2.
A. J. Kahler, Truck Driver.
R. R. Kelley, Engineer.
L. Kerber, Extra Gang Foreman.
T. Kuiper, Watchman.
R. E. Larson, Computor.
H. W. Libby, Chief Locating Engineer, Navy, Lieutenant-Comdr.
O. S. McEwan, Head Chainman.
D. D. McHugh, Baker & Truck Driver.
C. H. Maison, Ledgers Supervisor, Navy.
M. W. Mangis, Truck Driver.
R. J. Marlton, Section Foreman Helper.
P. E. Miller, Head Chainman.
O. C. Miltenberger, Truck Driver.
C. N. Monroe, Section Foreman Helper.
C. H. Morisette, Shovel Operator.
C. C. Niles, Office Assistant.
L. W. Oakley, Tabulating Machine Operator, Army, Lieutenant.
G. Y. Olson, Laborer.
D. A. Orey, Truck Driver.
E. S. Park, Assistant Special Mechanic.
D. J. Rasmussen, Laboratory Assistant.
H. Say, Travel Director, Navy, Lieutenant.
H. Schroeder, Laborer.
V. E. Sellers, Laborer.
H. W. Sexton, Chainman.
L. S. Shields, Bridge Designer, Army, Lieutenant.
T. A. Shaver, Office Assistant, Grade 1.
A. G. Skelton, District Maintenance Supt., Marines, Major.
D. E. Smith, Laborer.
L. C. Smith, Laborer.
M. R. Smith, Boilerman.
F. W. Soller, Chainman.
A. C. Spinney, Section Foreman Helper.
W. C. Squires, Laborer.
J. C. Stewart, Chainman.
H. O. Thomas, Truck Driver.
P. Thomas, Rollerman.
C. E. Thompson, Computor.
D. M. Townsend, Weighmaster.
G. K. Tonkin, Head Chainman.
G. Tucker, Clerk, Army.
R. A. Wallace, Laborer.
V. Warren, Research Assistant.
V. D. Wolfe, Draftsman.
A. York, Head Chainman.

MAINE
(Engineering Personnel only, as of April 21)

W. Blake, Junior Engineer, Navy, Lieutenant (j.g.).
H. D. Hersum, Junior Engineer, Army, Major.
L. F. Decker, Engineering Aide, Army, Lieutenant.
W. L. Stisulis, Engineering Aide, Navy, Engr. Train. School.
C. M. Ellis, Engineering Aide, Army, Corporal.
R. E. Wilson, Engineering Aide, Army.
R. E. Drown, Engineering Aide, Army.
R. Clifford, Engineering Aide, Army, Lieutenant.
W. H. Bradford, Accountant, Army, 1st Lieutenant.
J. Sweatt, Chemist, Army, 1st Lieutenant.

UTAH
(Engineering Personnel only, as of May 7)

J. Hague, Transitman, Engineers, Private.
E. W. Heath, Levelman, Navy, Carpenter's Mate.
R. M. Herbert, Levelman, Field Artillery, 1st Lieutenant.
D. Hillam, Designer, Coast Artillery, 1st Lieutenant.
J. L. Holbrook, Resident Engineer, Engineers, Captain.
M. Housecroft, Chief Bridge Engineer, Engineers, Major.
W. F. Hughes, Soil Analyst, Engineers, Captain.
M. E. Hunt, Draftsman, Engineers, Major.
S. H. Knowlton, Asst. District Engineer, Field Artillery, Major.
G. Matthews, Draftsman, Field Artillery, Captain.
J. E. Morarity, Transitman, Field Artillery, 1st Lieutenant.
R. D. Nelson, Levelman, Field Artillery, 1st Lieutenant.
J. W. Noall, Resident Engineer, Field Artillery, Captain.
H. Peters, Laboratory Tester, Field Artillery, Sergeant.
M. L. Roby, Draftsman, Navy, Ensign.
D. E. Severn, Clerk, Infantry, Private.
J. A. Shaw, Draftsman, Infantry, 1st Lieutenant.
E. J. Watson, Draftsman, Navy, C. C. M.
G. H. Newell, Levelman, Air Corps, Cadet.

MISSISSIPPI
(As of June 25)

R. M. Persell
N. M. Barland
H. T. Nagle
C. R. Sanders
G. J. Barton
S. R. Teunnison
R. H. Wood
H. V. Mahan
J. P. Thaxton
W. C. Hamilton
H. R. Owen
H. B. Davis
F. Searcy
O. Winstead
J. R. Puryear
W. A. Kennedy
R. A. Bendinelli
W. J. Harrington
T. T. Hurst
D. Browning
J. H. Hathcock
J. Reeves
J. H. Hardin
J. Hathorn
W. C. Edwards, Jr.
J. Teunnison
D. B. McCaa
T. Hankins
B. G. Burt
J. R. Helms
R. E. Miller
C. E. Browning
P. N. Jemison
G. H. Manning
N. Getwan
J. O. Walsh
J. Ewing
C. C. Moffett
L. L. Combs
R. Brown
L. Johnson
A. M. White
L. Oakes
R. B. Scobey
W. W. Reagan
C. Catt
J. E. Branscome
J. Edwards
J. L. Tilgham
P. Taylor
W. Dorsey
M. Dunnam
W. J. Lee
R. E. Rankin
L. W. Guy
J. Gordon
P. Evans
T. E. Travis
W. C. Clark
E. H. Smith
J. C. Saucier
I. Smith
A. C. Collinson
W. W. Wolfe
H. H. Wolfe
W. J. Crecink
P. Gaither
R. Gordon
A. B. Smith
C. Scott
J. Bowen
R. T. Causey
W. A. Tillman
J. P. Williamson, Jr.
W. F. Frizsell
M. W. Bond
H. B. Majure
L. H. Burris
J. Barrett
G. S. Covert
W. B. Berry
W. Purvis
J. P. Steinwinder
H. Hathorn
L. H. Armstrong
J. Garrett
J. Cassels
W. Daley
F. C. Cain
G. Lemon
F. H. Lacey
W. Bullard
W. C. Callahan
H. L. Germany
R. E. Allen
W. Craig
A. J. Fooshee
J. Allen, Jr.
B. Baine
C. R. Balch
J. M. Brand
E. M. Burt
J. R. Davis
J. C. Harris
D. Jean
A. Martin
T. P. Morrow
H. T. Munn
C. D. Pritchard
C. C. Provine
M. J. Scruggs
J. Shaw
N. L. Smith
C. J. Stubbs
E. B. Thomas
J. F. Thompson

R. P. Vining
J. W. Wilson
H. Wyatt
F. C. Young
H. P. Martin
W. A. Russell
G. C. Brown
G. A. Draper
H. Wright
J. Collins
W. B. Burns
H. Patterson
E. N. McSwain
P. M. Eakes
C. C. Parsons
J. R. Jones,Jr.

IOWA

(Engineering Personnel only, as of June 23)

V. G. Gould
L. H. Devine
W. Fisher
H. A. Dugan
J. A. Schneider
R. W. Ott
H. Griffiths
C. C. Lamborn
D. J. Raaz
D. H. Larson
J. E. Newland
W. C. Ohlsen
F. Monthei
R. N. Alvestad
E. T. Adams
F. Smith
C. DeYoung
R. Schlotterback
L. G. State
A. A. Baustian
D. P. Morrissey
C. W. Gustavson
J. E. Beck
B. F. Long
R. J. Cavanaugh
E. T. Burk

FLORIDA

(As of June 27)

R. C. Woolwine, File Clerk, Army.
Manuel Duran, Rodman, Army.
John F. Coon, Truck Driver, Army.
Joe Corbett Vickers, Inspector, Army.
John S. Consigny, Inspector, Army.
D. J. Westbrook, Rodman, Army.
Frank F. Rathbun, Clerk, Army.
R. V. Hasty, Rodman, Army.
Robert Longworth, Rodman, Army.
M. B. Allen, Project Engineer, Army.
Charles A. Doll, Draftsman, Army.
J. Leslie Bennett, Rodman, Army.
J. E. Robinson, Jr., Rodman, Navy.
L. L. Parrish, Yardman, Army.
Ovid Green, Guard, Navy.
Harry O. Cole, Jr., Maintenance Clerk, Army.
Wallace W. Hopper, Jr., Stock Clerk, Army.
Richard J. Burright, Rodman, Army.
Samuel A. Eggers, Jr., Asst. Chemist, Army.
William R. Wooten, Rodman, Army.
Charlie F. Scruggs, Maintenance Engineer, Army.
Clyde W. Campbell, Clerk, Army.
Aubry Rogers, Truck Driver, Army.
Homer D. Purvis, Rodman, Army.
John D. Williams, Jr., Asst. Project Engineer, Army.
Henry E. Lewis, Project Engineer, Army.
Clyde Thompson, Draftsman, Army.
Bennett R. Wattles, Levelman, Army.
R. Edgar Beauchamp, Clerk, Army.
H. M. Johnson, Project Engineer, Army.
H. E. Alexander, Laboratory Assistant, Army.
Edgar S. Anderson, Draftsman, Army.
Vernon L. Bales, Rodman, Army.
Earl Lemar Batton, Rodman, Army.
Martin Brunson, Draftsman, Army.
L. K. Cannon, Jr., Asst. Traffic Engr., Army.
William A. Clark, Rodman, Navy.
B. R. Cox, Jr., Rodman, Army.
L. E. Gupton, Rodman, Army.
A. H. Davis, Laboratory Assistant, Army.
Benjamin F. Ridenour, Office Asst., Army.
Farris H. Davis, Inspector, Army.
Joe E. Edwards, Jr., Rodman, Army.
B. H. Ervin, Draftsman, Army.
George Howell Fender, Lineman, Army.
George Fowler, Asst. Foreman, Navy.
E. L. Godwin, Inspector, Army.
O. R. Harmon, Truck Driver, Army.
Joseph Victor Herold, Rodman, Army.
Thomas Maston Kilgore, Jr., Inspector, Navy.
John A. Lanehart, Draftsman, Army.
R. W. Logan, Inspector, Army.
William A. Loudermilk, Rodman, Army.
W. W. Lewis, Rodman, Army.
Richard Leffers, Draftsman, Army.
Richard E. McGaughey, Draftsman, Canadian Air Force.
Holmes W. Melton, Jr., Student Helper, Navy.
J. C. Pound, Yardman, Army.
Wm. E. Powell, Rodman, Army.
Willard Norris, Inspector, Army.
Jimmy Parramore, Draftsman, Army.
Alexander Scott Reynolds, Drainage Engineer, Army.
Alton Rivenbark, Rodman, Navy.
Edward L. Smith, Draftsman, Army.
J. W. Stagner, Rodman, Navy.
John Trice, Rodman, Army.
Dan F. Turnbull, Rodman, Navy.
John Earl Wade, Truck Driver, Army.
D. H. Williams, Guard, Army.
Hugh E. Williams, Jr., Party Chief, Army.
M. B. Winn, Levelman, Army.
Edward E. Worth, Truck Driver, Army.
J. A. Riviere, Division Location Engineer, Navy.

PENNSYLVANIA

(As of June 26)

H. E. Thornber, Asst. Const. Engr.
R. W. Lerch, Materials Engr.
G. G. Alderfer, Jr. Draftsman.
C. F. Walborn, Sr. Const. Insp.
F. W. Aungst, Sr. Draftsman.
C. S. Wagner, Asst. Maint. Supt. Pr. Gr.
M. W. Flickinger, Asst. Const. Insp.
C. E. Arcaro, Equipment Operator.
S. Ostimchuk, Jr. Draftsman.
J. E. Smith, Equipment Operator.
W. B. Emigh, Equipment Operator.
W. E. Sloan, Asst. Const. Insp.
D. D. Eagan, Chainman.
K. W. Chrisemer, Map Draftsman.
F. De Horatus, Jr. Const. Insp.
W. D. McCahan, Sr. Engr. Clk.
R. M. Hollinger, Asst. Draftsman.
H. H. Rowley, Chainman.
J. J. Gordon, Supt. Clk.
L. Ott, Equipment Operator.
H. W. Anderson, App. Const. Insp.
H. R. Imbt, Sr. Matls. Insp.
L. B. Bentley, Jr., Jr. Draftsman.
S. E. Spleen, Asst. Maint. Supt. Jr. Gr.
J. A. Welch, Draftsman.
G. H. Yarnall, Map Draftsman.
E. Hayes, Draftsman.
H. E. Brown, Project Engr.
J. A. Downes, Sr. Draftsman.
J. J. Hower, Jr. Const. Insp.
J. L. Mulligan, Chainman.
R. P. Weis, Res. Engr.
G. C. Richards, Asst. Drafts.
W. Tait, Maint. Foreman.
S. M. Lutz, Jr., Signal Engr.
F. L. Battles, Equip. Oper.
S. G. Saylor, Mech.
J. W. Pritts, Jr. Const. Insp.
R. D. Rahn, Asst. Const. Insp.
R. W. Shannon, App. Const. Insp.
R. C. Finafrock, Equipment Operator.
W. J. Ollinger, Chainman.
F. Skubis, Chainman.
A. G. Smialkowski, Laboratory Asst.
M. Rockwell, Auditor.
P. F. Keating, Instrumentman.
P. W. Lindeman, Chainman.
J. H. Taylor, Chainman.
C. L. Wolfe, Chainman.
J. W. Robbins, Sr. Const. Insp.
J. E. Fiorino, Jr., Payroll Clk.
W. E. Schmiedel, Jr. Const. Insp.
C. C. Witherow, Asst. Const. Insp.
H. S. Mann, Asst. Const. Insp.
R. S. Mackey, Jr. Draftsman.
P. H. O'Neill, Rodman.
R. M. Graham, Asst. Draftsman.
T. Llewellyn, Asst. Supt. Clk.
C. B. Wilkins, Jr. Const. Insp.
R. H. Jones, Asst. Matls. Insp.
A. F. Snyder, Jr. Tab. Machine Oper.
A. R. Shaffer, Chainman.
J. G. Strange, Jr. Const. Insp.
J. S. Barr, Rodman.
B. F. Bigley, App. Draftsman.
R. L. Fisher, Jr. Const. Insp.
P. H. Kulp, Chainman.
N. L. Sherr, Jr. Draftsman.
W. C. Patterson, Instrumentman.
E. G. Tait, Chainman.
T. J. Bonner, Chainman.
M. S. Leland, Sr. Const. Insp.
G. P. Hugus, Chainman.
L. J. Butterine, Chainman.
M. D. Hammon, Asst. Const. Insp.
H. B. Mertz, Chainman.
S. M. Fortino, Asst. Matls. Insp.
W. W. Bohn, Adv. Lab. Asst.
P. Zanotto, Jr. Record Clk.
A. F. Stefanic, Adv. Lab. Asst.
J. L. Bechtel, Asst. Draftsman.
J. M. Crouse, Asst. Code Clk.
R. O. Bouder, Appr. Draftsman.
F. P. Farrell, Instrumentman.
J. W. Natzle, Asst. Const. Insp.
S. J. Zayach, Jr. Const. Insp.
W. W. Walters, Jr., Sr. Const. Insp.
C. D. Heckel, Project Engr.
W. R. Tipping, Jr. Const. Insp.
C. P. Dodds, Chainman.
R. M. Hollinger, Asst. Draftsman.
N. Dilley, Asst. Const. Insp.
J. J. Hare, Chainman.
F. C. Buck, Chainman.
R. E. Fetterman, Asst. Const. Insp.
C. L. Agostinelli, Jr. Asst. Draftsman.
O. H. Dieffenderfer, Jr. Asst. Draftsman.
R. R. Reinwald, Chainman.
W. E. Kochenderfer, Chainman.
W. B. Hoke, Jr., Chainman.
J. M. Alexander, Jr., Jr. Asst. Const. Insp.
J. Grozanick, Rodman.
W. J. Cummins, Jr. Asst. Draftsman.
V. A. Angeloni, Jr. Asst. Const. Insp.
R. M. Clark, Chainman.
C. H. Plummer, Asst. Const. Insp.
L. W. Nase, Jr., Jr. Const. Insp.
C. W. Crone, Blue Print Helper.
R. J. Misantoni, Equipment Operator.
W. C. Hall, Equipment Operator.
D. H. Piltz, Asst. Draftsman.
G. M. Fleisher, Jr. Draftsman.
M. R. Jones, Jr. Asst. Insp.
A. L. Carll, Jr. Const. Insp.
G. Krikery, Asst. Const. Insp.
A. R. Olson, Supts. Clk.
J. C. Lancaster, Jr. Asst. Drfts.
B. Hilliard, Jr. Asst. Const. Insp.
R. W. Whalen, Engr. Clk.
E. C. Small, Chainman.
P. C. Bender, Asst. Drafts.
D. S. LeVan, Jr. Const. Insp.
H. J. Martin, Jr. Drafts.

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ROADS AND STREETS

H. E. Brown, Asst. Const. Insp.
H. L. Rorer, Chainman.
R. K. Heiler, Jr. Drafts.
J. H. Stebbins, Sr. Photographer.
M. Boogar, Dist. Twp. Engr.
H. R. Beals, Dist. Clerk.
H. C. Borzelleca, Weigh Checker.
J. T. Kerr, Jr. Asst. Drafts.
W. E. Hench, Chainman.
D. F. Varndell, Jr. Asst. Drafts.
D. W. Quigley, Chainman.
P. C. Snoke, Jr. Const. Insp.
T. C. Davis, Chf. Pty. Jr. Gr.
W. B. Kline, Sr. Cost Clk.
W. J. Caroff, Jr. Const. Insp.
C. P. Boden, Engr. Clk.
N. L. Dodge, Instr.
H. B. Morss, Asst. Drafts.
J. P. Magner, Foreman.
E. J. Gauly, Asst. Const. Insp.
R. E. Harley, Jr. Asst. Drafts.
R. P. Jury, Garage Clk.
C. Rainey, Jr. Const. Insp.
G. R. Halliwell, Jr. Asst. Drafts.
C. C. Smith, Project Engr.
A. E. Kibler, Instrumentman.
R. G. Robinson, Jr. Maint. Supt.
J. A. Fritz, Chainman.
E. Marmer, Sr. Const. Insp.
F. R. Heck, Chainman.
E. Jones, Ledger Clk.
E. Stoner, Chainman.
S. Gray, Jr., Stores Record Clk.
D. A. Gigliotti, Instrumentman.
R. Thompson, Equip. Clk.
E. F. Kocher, Jr. Const. Insp.
L. L. Warsing, Jr. Code Clk.
C. M. Borland, Equip. Clk.
W. F. Hammond, Jr. Drafts.
P. M. Drumheller, Jr. Const. Insp.
V. J. Brady, Jr. Const. Insp.
W. F. Masimer, Foreman.
J. L. MacAvoy, Chainman.
J. D. Stouffer, Jr. Asst. Chemist.
J. J. Williams, Draftsman.
C. V. Swope, Asst. Draftsman.
R. Thomas, Chainman.
J. P. Harlow, Chf. Pty. Sr. Gr.
C. E. Costenbader, Jr. Asst. Const. Insp.
J. R. Mayse, Jr. Const. Insp.
E. L. Hawkins, Jr. Const. Insp.
L. DePaolis, Jr. Drafts.
G. L. Myers, Chainman.
J. W. Kiley, Jr., Supt. Clk.
R. J. Massey, Sr. Const. Insp.
P. Molnar, Sr. Const. Insp.
H. A. Johnson, Recorder.
J. E. Kowalski, Chainman.
F. L. Charlton, Sr. Const. Insp.
C. H. McCormick, Chf. Pty. Adv. Gr.
J. G. Sincavage, Asst. Matls. Insp.
R. F. Neff, Instrumentman.
R. V. Bowers, Asst. Drafts.
J. E. Black, Sr. Lab. Asst.
R. M. Childs, Equipment Clk.
T. S. Evans, Instr.
F. C. Doty, Sr. Drafts.
J. A. Bodner, Chainman.
B. Rifkin, Jr. Asst. Drafts.
M. V. Fink, Asst. Drafts.
F. V. Martin, Jr. Asst. Drafts.
M. W. Sweney, Instrumentman.
J. Hall, Jr., Laborer and Equip. Oper.
W. J. Raves, Project Engr.
F. C. Vogel, Instrumentman.
E. Aiello, Chainman.
A. Povirk, Jr. Asst. Drafts.
J. B. McVicker, Chainman.
J. C. Wishart, Project Engr.
F. E. Eisenman, Jr. Drafts.
R. R. Hutchison, Jr. Asst. Const. Insp.
E. D. Heffernan, Equipment Clk.
N. G. Handgis, Chainman.
C. K. Bates, Asst. Drafts.
E. J. Politoske, Asst. Dist. Const. Engr.
A. B. Spalla, Instrumentman.
G. W. Black, Equipment Operator.
J. J. Cline, Equipment Operator.
R. W. Bensinger, Equipment Operator.
C. A. Radicchi, Jr. Drafts.
D. Phillips, Jr., Chainman.
B. P. Baileys, Sr. Const. Insp.
F. Westhoff, Equipment Operator.
W. Mulligan, Equipment Operator.
V. Kaminsky, Asst. Drafts.
W. R. Owens, Chainman.
D. W. Nolte, Jr., Sr. Stat Clk.
M. D. Migrath, Jr. Const. Insp.
G. C. Pfrom, Chainman.
M. T. Sands, Chainman.
J. Monastero, Const. Foreman.
G. E. Kline, Asst. Maint. Supt.
W. C. Jones, Jr. Const. Insp.
R. Powell, Jr. Const. Insp.
F. F. Clouser, Engr. Clk.
J. W. Davis, Chainman.
J. E. Loughran, Jr. Dist. Const. Engr.
G. W. Young, Jr., Chainman.
J. M. Seaks, Jr. Const. Insp.
R. L. Zeigler, Asst. Drafts.
L. A. Carlson, Maint. Foreman.
R. A. Williams, Jr. Asst. Drafts.
P. A. Zanardelli, Jr. Const. Insp.
W. B. Joyce, Des. Drafts.
F. F. Walter, Instrumentman.
A. J. Savignano, Drafts.
D. B. DeForest, Jr. Const. Engr.
J. F. O'Brien, Chainman.
P. M. Rulli, Instrumentman.
P. H. Knouse, Equipment Clk.
E. W. Tennis, Project Engr.
C. Hill, Dist. Twp. Engr.
F. J. Horan, Truck Driver.
C. B. Sheetz, Chauffeur.
A. Angello, Equipment Operator.
L. Laws, Jr., Jr. Asst. Insp.
W. J. Moore, Jr. Asst. Const. Insp.
W. R. Sullivan, Asst. Drafts.
E. P. Fahringer, Dist. R/W Supv.
W. H. Farley, Equipment Clk.
L. Moorhead, Asst. Drafts.
R. J. Jarsensky, Asst. Drafts.
W. Myers, Equipment Operator.
B. F. Orndoff, Chainman.
W. S. Freytag, Chainman.
A. N. Maffei, Junior Draftsman.
R. L. Lasher, Junior Draftsman.
J. B. Shallcross, Jr. Dist. Const. Engr.
A. Rochelle, Sr. Draftsman.
R. L. Mason, Chainman.
G. W. Brown, Asst. Draftsman.
J. W. Gibboney, Jr. Asst. Draftsman.
S. G. Williams, Jr. Const. Insp.
F. Parker, Jr., Supt's. Clerk.
H. T. Van Dyke, Rodman.
J. E. Buch, Dist. Const. Engr.
V. A. Simonsen, Jr. Maint. Supt.
L. T. Kerr, Sr. Const. Insp.
N. L. Dodge, Instrumentman.
T. J. Harrington, Project Engineer.
C. W. Gerhardt, Equip. Operator.
J. H. Womer, Jr., Jr. Inv. Clerk.

LOUISIANA

(Engineering Personnel Only. As of April 30)

TRAFFIC & PLANNING SECTION:
W. L. Kidd, Traffic Recorder, Navy, Radio Operator.
W. A. Rose, Road Inventory, Army, Private.
D. F. Dabney, Jr. Traffic Recorder, Coast Guard.
G. L. Viavant, Jr. Traffic Recorder, Coast Guard.
S. F. Karpe, Recorder-Technician, Navy, Ensign.
J. M. Jollisant, Traffic Clerk, Air Corps, 2nd Lieutenant.
PROJECT CONTROL SECTION:
C. W. Peters, Estimates Squad Leader, Army, Captain.
G. D. Johnston, Estimates Squad Leader, Army, Captain.
A. R. Swindell, Progress Voucher Clerk, Army, Captain.
R. M. Lovelace, Jr. Proposal Engineer, Army, 1st Lieutenant.
J. I. Martin, Jr. Earthwk. Computer, Army, 1st Lieutenant.
ROAD DESIGN SECTION:
E. A. Broders, Jr. Road Draftaman, Navy, Machinist Mate (1st cl.).
T. F. Donlon, Sr. Road Draftsman, Naval Res., Lieutenant (j.g.).
J. A. Holland, Sr. Road Draftsman, Army, Major.
J. A. Holliday, Jr. Road Draftsman, Army, Captain.
C. S. Simmons, Apprentice Draftsman, Naval Res. Air C., Flying Cadet.
R. C. Dudley, Sr. Road Designer, Army, 2nd Lieutenant.
A. R. Kent, Road Drf. Squad Leader, Army, 1st Lieutenant.
RIGHT-OF-WAY SECTION:
C. Gibson, Jr. R/W Draftsman, Naval Res., Petty Officer.
CONSTRUCTION & MAINTENANCE SECTION:
V. M. Barrett, Sr. Roadway Inspr., Army.
T. C. Howard, Levelman, Army.
R. Overton, Jr. Instrumentman, Army.
J. Raziano, Jr. Instrumentman, Army.
W. Broussard, Jr. Instrumentman, Army.

KANSAS

(Engineering Personnel Only. As of June 25)

H. Glidden, Office Assistant R/W Engineer.
W. N. Hornish, Assistant Engineer, Gr. C.
O. S. Enrich, Assistant Engineer, Gr. C.
W. J. Wohlfarth, Assistant Engineer, Gr. B.
E. Maier, Associate Engineer, Gr. A.
W. H. Murray, Associate Engineer, Gr. A.
H. I. Taylor, Assistant Engineer, Gr. C.
M. W. Wilcox, Assistant Engineer, Gr. A.
W. T. Kilian, Assistant Engineer, Gr. C.
W. R. Carlson, Assistant Engineer, Gr. C.
W. G. Heer, Assistant Engineer, Gr. A.
R. N. Mitchell, Assistant Engineer, Gr. B.
R. G. Lawrence, Junior Engineer, Gr. A.
E. G. Orrick, Junior Engineer, Gr. A.
L. R. King, Senior Engineer, Gr. C.
V. Carter, Assistant Engineer, Gr. A.
G. R. Anderson, Senior Engineer, Gr. C.
E. Hubble, Associate Engineer, Gr. C.
A. D. Kaufman, Junior Engineer, Gr. C.
L. L. Peterie, Junior Engineer, Gr. B.
E. J. Peltier, Senior Engineer, Gr. C.
R. Wall, Assistant Engineer, Gr. B.
C. F. Smith, Associate Engineer, Gr. A.
C. E. Pate, Assistant Engineer, Gr. B.
I. D. S. Kelly, Senior Engineer, Gr. B.

MARYLAND

(Engineering Personnel Only. As of April 21)
Left for military service

E. Sauerman, Jr., Asst. Chemist, Feb. 10, 1942.
C. G. Bowers, Jr. Draftsman, Feb. 17, 1942.
E. W. Davis, Jr. Draftsman, Mar. 22, 1942.
I. C. Hughes, Jr. Draftsman, Apr. 8, 1942.
R. L. May, Jr. Draftsman, Jan. 15, 1942.
M. McCord, Sr. Bridge Draftsman, May 1, 1941.
J. V. Blazowski, Jr. Engineering Aide, Apr. 15, 1942.
W. T. Mason, Jr. Engineering Aide, Apr. 22, 1941.
C. F. Roth, Jr. Engineering Aide, Aug. 11, 1941.
W. T. Sprague, Jr. Engineering Aide, Jan. 27, 1942.

Metal for New Drainage?

WE'D LIKE TO SAY "YES" . . . . . BUT SOON WE'LL HAVE TO SAY "NO"

★

Frankly, here's the story: it is no longer possible to obtain galvanized culvert sheets . . . except where permitted by special provisions of the Federal Government.

Every available ton of steel is now going into war materials . . . and into civilian needs that are vital to winning a victory.

There are some stocks of fabricated pipe on hand. But they are limited. When these stocks are exhausted, further sales and deliveries of corrugated metal pipe will be confined to Federal approved projects.

For some of us these are facts that will bring about inconveniences difficult to bear. But the reasons back of our present inability to supply needed culvert pipe are justifiable. None of us could disagree on that. First we must win a war.

The time will come when these necessary sacrifices will bear fruit. Let's all give energy and heart toward that objective. The Toncan Culvert Manufacturers Association, Republic Bldg., Cleveland, Ohio.

C. W. Zellers, Jr., Jr. Engineering Aide, Jan. 3, 1942.
G. M. Waxman, Jr. Typist (Engr.), Dec. 31, 1941.
D. D. Kennedy, Road Inspector, Jan. 6, 1941.
J. B. Kuhns, Road Inspector, Oct. 5, 1940.
J. M. Schaefle, Sr. Clerk (Engr.), Feb. 3, 1941.
D. H. Rees, Statistical Clerk (Engr. Div.), Dec. 31, 1941.

CONNECTICUT
(As of June 26)

R. O. Wilson, Sr. Engineering Aide, Army.
A. E. Eldridge, Engineering Aide, Army.
D. Donaghue, Engineering Helper, Army, Private.
W. T. Christensen, Sr. Engineering Aide, Army.
P. Hurley, Jr., Engineering Helper, Coast Guard, Corporal.
T. I. Wilson, Sr. Engineering Aide, Army.
G. T. Peck, Engineering Helper, Army, Private.
H. S. Ives, Asst. Highway Engineer, Coast Artillery (AA), Major.
R. H. Sinay, Engineering Helper, Infantry, Second Lt.
W. J. Hoddinott, Sr. Engineering Aide, Army, 1st Lieut.
A. Dingwall, Jr. Engineering Aide, Army, Private.
J. J. Olshesky, Sr. Engineering Aide, Army, Private.
R. Chamberlain, Jr. Engr. Helper, Army, Private.
C. E. Larson, Sr. Draftsman, Navy.
W. L. Holsten, Asst. Highway Engineer, Air Corps, First Lt.
H. F. Mellen, Jr. Engineering Aide, Army, Private.
F. W. Phillisp, Jr. Highway Engineer, Army, Quartermaster-Sergeant.
C. H. Romanowski, Jr. Engineering Aide, Army, Captain.
J. J. O'Brien, Jr. Engineering Aide, Army, Sergeant.
E. McVey, Sr. Engineering Aide, Army, Private.
P. J. Rothkamm, Jr. Highway Engineer, Army.
W. Beecher, Jr. Engineering Aide, Army, Private.
P. A. E. Flux, Asst. Highway Engineer, Navy.
R. Hill, Engineering Helper, Navy.
E. O. Raupach, Jr. Engineering Aide, Army, Private.
A. H. Bogin, Jr. Engineering Aide, Army, Private.
I. R. Nelson, Engineering Helper, Army.
J. E. Slowik, Sr. Engineering Aide, Army Air Corps, Flying Cadet.
A. J. Tyler, Jr., Jr. Engineering Aide, Army, Private.
M. Garvie, Engineering Helper.
R. B. Quinn, Jr. Engineering Aide.
M. W. Bill, Sr. Engineering Aide, Navy Coastal Patrol.
A. S. Schnip, Jr., Engineering Helper, Army.
W. F. Turner, Jr. Engineering Aide.
W. F. Hill, Jr. Engineering Aide, Navy.
E. Bongar, Jr. Engineering Aide, Navy.
E. J. Duhaime, Jr. Engineering Aide, Army.
M. Ogens, Jr. Engineering Aide, Army.
W. M. Loeffler, Sr. Engineering Aide.
J. N. Harper, Sr. Engineering Aide, Marine Corps.
A. Dickinson, Sr. Engineering Aide, Army, Private.
A. Janovicz, Engineering Helper, Navy.
K. F. Crawford, Engineering Helper, Navy.
B. H. King, Sr. Engineering Aide, Army, Captain.
J. G. Mahoney, Engineering Helper, Army, Private.
H. H. Bottomley, Sr. Engineering Aide, Army, Private.
R. W. Hurst, Jr. Engineering Aide, Air Corps.
P. A. Spinnato, Jr. Engineering Aide, Army.
A. E. Stemmeler, Jr. Engineering Aide.
R. L. Turner, Sr. Engineering Aide.
I. Resnikoff, Jr. Highway Engineer, Army.
H. Thorner, Sr. Engineering Aide, Army.
G. Ranger, Jr. Engineering Aide, Army.
C. D. Moulton, Sr. Engineering Aide, Army, Private.
C. Linderson, Jr., Jr. Engineering Helper, Air Corps.
J. H. Brousseau, Engineering Helper, Marine Corps.
D. Lynch, Jr. Highway Engineer, Navy.
G. S. Koch, Jr. Engineering Aide, Air Corps.
D. P. Foley, Engineering Helper, Marine Corps, Private.
H. T. Davidson, Sr. Engineering Aide, Air Corps, Flying Cadet.
J. Tortorici, Sr. Engineering Aide.
R. B. Northam, Sr. Engineering Aide, Army, Private.
R. E. Moe, Chief Draftsman, Army.
J. P. Trowbridge, Sr. Engineering Aide.
D. A. Simard, Engineering Helper, Marine Corps.
C. Anderson, Sr. Engineering Aide.
G. L. Durstein, Sr. Engineering Aide.

DELAWARE
(As of July 2)

T. Ashcraft, Rodman, Sergeant, Anti-Aircraft.
G. Bennett, Maintenance, Army.
C. Brown, Field Engineer, Lt., Coast Artillery.
F. Cataldi, Chainman, Navy.
M. Cirrigione, Maintenance, Private, Engineering.
C. Cunane, Maintenance, Army.
T. P. Dabson, Engineer, 1st Lt., U. S. Engineers.
G. Ford, Maintenance, Captain, Coast Artillery.
C. Gardner, Maintenance, Tank Corps.
C. Goodwin, Survey, 1st Lt., Coast Artillery.
J. M. Gordon, Designing Engineer, Captain, Anti-Aircraft.
R. A. Haber, Assistant Engineer, 2nd Lt., U. S. Engineers.
M. Harrington, Soils Engineer, Lt., Engineering.
P. Hollowell, Engineering, Sergeant, Anti-Aircraft.
V. Jost, Engineer of Design, Private, Engineering.
P. Lattomus, Maintenance, Army.
W. Marks, Maintenance, Army.
P. Marvel, Stenographer, Air Corps.
W. McLoughry, Tracer, Lt., Air Force.
W. A. McWilliams, Division Engineer, Captain, Coast Artillery.
W. Miller, Asst. Traffic Engr., 2nd Lt., U. S. Engineers.
R. E. Ramsey, Survey, Captain, Coast Artillery.
T. Reed, Maintenance, Army.
W. Roach, Maintenance, Private, Medical Corp.
Oliver Roberts, Engineering, Infantry.
P. Roeder, Surveyor, Lt., Coast Artillery.
W. Rogers, Surveyor, Private, Quartermaster Corps.
E. Short, Maintenance, Private, Over Sea Service.
J. Stackley, Asst. Engineer, Lt., Anti-Aircraft.
J. Thompson, Maintenance, Private, Coast Artillery.
R. Weatheral, Survey, Captain, Coast Artillery.

First Flight Strip Completed

The first flight strip has been completed and is now ready for use. Others are in the process of being surveyed in the Pacific Northwest. Built by PRA in cooperation with the Army Air Forces, flight strip No. 1 is located "somewhere along the Atlantic seaboard."

No. 1 flight strip is 8,000 ft. long and 500 ft. wide, with a landing strip 7,000 ft. long and 150 ft. wide, paved in concrete 8 in. thick. Stabilized soil shoulders surround the strip, which will be used for emergency landings and take-offs.

Construction of the Eastern Seaboard strip was completed well ahead of schedule. Other projects are under way and the first program for which Congress has made appropriations available will be completed by fall.

While the Army designates the strategic areas in which the roadside landing strips are located, the actual building of the strips is the responsibility of the Public Roads Administration. Programming of the flight strips, and the order in which they are to be built, is being done by the Army Air Forces, which supply the general plans and specifications to PRA. Sites selected are submitted to the Army Air Forces for approval.

The flight strip program was approved in the Defense Highway Act of 1941 which authorizes the Commissioner of Public Roads in cooperation with the Army Air Corps to conduct studies and construct the strips. The acquisition of new or additional land needed may be included as a part of the construction program to the extent determined by the Federal Works Administrator. The act authorized an appropriation of $10,000,000 for the program, of which $5,000,000 has already been appropriated.

Federal Works Administrator Appoints Regional Director

Brigadier General Philip B. Fleming, Federal Works Administrator, has announced the appointment of the following F.W.A. Regional Directors: Robert L. MacDougall of Campbell County, Ga., for a group of southeastern states. Tentatively, the states embraced in the southeastern region are: Tennessee, Mississippi, Alabama, Georgia, Florida and South Carolina.

Since May 1941, Mr. MacDougall has been Assistant Commissioner in charge of the Division of Operations, Work Projects Administration. He has been identified with various public works and housing programs since 1933. Headquarters are in Atlanta.

Linus C. Glotzbach of St. Paul and New Ulm, Minn., for nine states west of the Mississippi. The region embraces Minnesota, Iowa, Missouri, Kansas, Nebraska, North and South Dakota, Colorado and Wyoming, with headquarters in St. Paul, Minnesota.

George H. Field, of Evanston, Ill., as FWA for a group of middle west states with headquarters in Chicago. States embraced in the FWA region are Illinois, Michigan, Indiana, Wisconsin, Ohio and Kentucky.

L. Abbott Post Appointed Manager American Institute of Steel Construction

Due to the increasing problems facing the industry, produced by the war and likely to be intensified by the peace, and in view of the resulting increase in work imposed upon the American Institute of Steel Construction, the Board of Directors of this organization has decided to create the position of Manager and has engaged L. Abbott Post of New York to fill that office. This appointment does not otherwise alter the staff of the Institute in personnel or

functions, all of which are continued. Mr. Post will have his duties assigned him by the Board of Directors and the Executive Vice-President.

Mr. Post was graduated from Stevens Institute of Technology, Hoboken, N. J., in 1918. He spent one year in Naval Aviation, joining the firm of Post & McCord in 1919, of which company he became vice-president. Post & McCord, as New York erectors of structural steel, built the Empire State Building, the RCA Building, and many other skyscrapers in New York City. During the past year Mr. Post has been attached to the Construction Branch, Production Division, of the War Production Board, in Washington, D. C.

Public Construction Equipment Listed

A survey of all construction equipment owned by highway departments of the various states and other local government units has been completed by the Bureau of Governmental Requirements, and is now available for use by all government agencies.

The survey, the first of its kind, has been completed under the direction of Louis Levenson, chief of the construction equipment section of the Bureau. Answers to questionnaires have been received from all state highway departments. Responses were also received from virtually all of more than 3,000 counties sent questionnaires, 1,100 cities of 10,000 population and over, and 3,500 cities and towns under 10,000 population.

The survey as completed lists 34 types of equipment, with details as to age and condition. Many governmental agencies have already found the survey helpful in locating equipment which can be leased or rented by one highway department to another for important war work.

Fellows Appointed Assistant WPA Commissioner

Perry A. Fellows has been appointed Assistant WPA Commissioner in charge of the Division of Operations. He succeeds R. L. MacDougall, who has been appointed Regional Director of the Federal Works Agency for the Southeastern States.

Mr. Fellows has been the Chief Engineer of the Work Projects Administration since December, 1940. He will continue in that capacity while assuming the additional duties of the head of the Division, which embraces engineering activities and the operation of construction projects.

Mr. Fellows was City Engineer of Detroit from 1925 to 1931, when he became Manager of the Detroit City Airport. In November, 1933, he was appointed Chief Regional Engineer for the Civil Works Administration in the North Central States. Thereafter Mr. Fellows held administrative and engineering posts with the Federal Emergency Relief Administration and for five years was Assistant Chief Engineer of the WPA.

He holds B.S. and M.S. degrees in civil engineering from the University of Michigan and is a member of various professional organizations, including the American Society of Civil Engineers and the Society for the Advancement of Management.

Concreting Finished at Friant Dam

The final cubic yard of concrete in Friant Dam was placed on June 16. A total of 2,130,480 cu. yd. of concrete has been placed in the dam.

The first bucket of concrete was placed in the east abutment section of the dam on July 29, 1940. Since that time a new California record for one month's concrete work was set when, during August 1941, the general contracting firm of Griffith Co. & Bent Co. poured 228,769 cu. yd. of concrete into the structure. This

monthly record stands today although the record daily pour, twice raised at Friant Dam, has since been exceeded at Shasta Dam, another feature of the Central Valley Project.

The placement of the final yard of concrete in the dam does not mean the completion of work on the structure itself. Work will continue for some weeks on the installation and painting of metal work, backfill, and cleanup operations. The drilling of grout holes in the foundation of the dam will continue for several months and grouting of the holes by Government forces will also be continued.

Friant Dam, the fourth largest concrete structure in the world, is on the San Joaquin River about 20 miles from Fresno, California. It is a straight gravity dam, with an overflow spillway in the center, four river outlets, four outlets into the Friant-Kern Canal, and two into the Madera Canal. The dam is about 320 ft. high, 3,430 ft. long at the crest, and 265 ft. wide at the base. Millerton Lake created by the dam has a capacity of 520,000 acre-feet of water. The reservoir will be used as a cushion for floods originating on the upper reaches of the river and will provide storage for supplemental irrigation water to be used in Madera, Fresno, Tulare, Kern, and Kings counties.

Nicholson Appointed Regional Director of F.W.A.

Rex Lee Nicholson, Seattle, Wash., has been appointed Regional Director of Region 7 of the Federal Works Administration, with headquarters in Salt Lake City, Utah. This completes the regional organization of F.W.A.

Mr. Nicholson has been Assistant Commissioner and Regional Director of the Work Projects Administration for eleven Western States and continues to serve in these capacities.

Mr. Nicholson was born in Texas but spent much of his boyhood in Kenton, Okla., before he went to Tacoma, Wash., where he completed his education. He started his engineering career with a Washington construction company as an ordinary laborer and advanced to chief engineer. Before his appointment as Assistant WPA Commissioner in February, 1941, he was WPA Regional Director for several Western States. He has been identified with Federal emergency relief work in Washington and other states since 1933. For the last three months Mr. Nicholson has been managing 17 assembly centers for people of Japanese ancestry evacuated from the Pacific Coast.

Mr. Nicholson's region includes Montana, Wyoming, Colorado, New Mexico, Arizona, Utah, Idaho, Nevada, Washington, Oregon and California. Because of the vast territory in this region and the number of war public works projects required by the West Coast war industries, two Sub-Regional Offices have been established, one in Seattle, Wash., and the other in San Francisco. R. L. Durkee, formerly Regional Engineer, was appointed Assistant Regional Director in charge of the Seattle office, and Pierce Williams, formerly Regional Representative, was named Assistant Regional Director in charge of the San Francisco office.

State Highway Construction in Indiana

Work was in progress on 31 more contracts on June 1 than on May 1, while there was a corresponding increase in employment by contractors engaged in construction and other work on the Indiana state highway system.

At the start of June the state highway commission had 57 road and 48 bridge contracts in operation. Reports by contractors engaged in these projects showed the direct employment of 2,471 workmen, an increase of 859 over the number similarly employed at the time of their April report.

About Contractors and Their Jobs

Kansas City Area

REPORTED BY
PAUL L. MATCHETTE

"Babe" Menefee, of W. J. Menefee Construction Company, Sedalia, Missouri, started hunting for old rubber during the recent drive. In a short time, he produced over two tons of old rubber from his equipment yard. "Babe" is one of the largest operators in the State of Missouri in the production of aggregate and the laying down of stabilized and black top roads. He recently has been producing gravel for O'Dell and Riney, at Fort Leonard Wood, Missouri.

* * *

H. O. Penn is reputed to be one of the best construction machinery distributors in the city of New York. Recently, the Government drafted Ham as Chief of the Used Construction Machinery Section, WPB. He has been holding meetings over the United States with different machinery organizations. On the 22nd of June, he held a meeting in Kansas City at the President Hotel, which was attended by a large gathering of construction machinery men from Missouri, Kansas, Nebraska and Iowa. Every man present was well impressed with the fine way the meeting was handled and all voted Ham Penn a vote of thanks for the help that he gave them.

* * *

The Missouri State Highway Department recently made a check-up in regard to the number of engineers and men who have resigned from the Department to enter the Government services. This check-up showed that 42 State Highway engineers from Missouri are now in the Army and Navy service. Two or three men are Lt. Colonels, several are Majors, and the rest are officers of different ranks. The check-up further shows that 280 State Highway workers, formerly on the State Highway payroll now have jobs in connection with the war activity.

* * *

On an airport job in western Missouri, Brosnahan Brothers, of Kansas City, and L. F. Harper, of Great Bend, Kansas, are doing the grading. Luke O'Brien is building the railroad and W. L. Johnson, of Lockland, Ohio, is doing the paving.

* * *

On an airport job in eastern Kansas, the following contractors are handling the work:

Koss Construction Company, Des Moines, Iowa—Runway Paving.

George Bennett Construction Company, Kansas City, Kansas—Grading.

Milton Rhienhardt, Russell, Kansas—Grading.

J. J. Connor Construction Company, Kansas City, Missouri—Utilities.

C. J. McCoy, Contractor, Emporia, Kansas—Water Lines.

Joseph O'Neil, Contractor, Leavenworth, Kansas—Sewers.

Kaw Paving Company, Topeka, Kansas—Street Paving and Roads.

Lane-Western Company, Kansas City, Missouri—Water Wells.

On an airport job in central Kansas, the following men are doing the work:

H. J. Taylor, Contractor, Salina, Kansas—Grading.

Atkinson Paving Company, Chilli-

cothe, Missouri—Concrete Paving.

Tobin Asphalt Products, Inc., Kansas City, Missouri—Asphalt Paving.

C. L. Burt, Hutchinson, Kansas—Sewers and Water.

Johnson Brothers, Contractors, Salina, Kansas—Buildings.

Peterson Construction Company, Salina, Kansas—Buildings.

Busboom and Rauh, Salina, Kansas—Buildings.

* * *

On an airport job in southeastern Kansas, the following contractors are doing the work:

Groves, Lundin and Cox, Minneapolis, Minnesota — Runway Paving and Grading.

Universal Construction Company, Coffeyville, Kansas—Buildings.

Pete Asplund, Enid, Oklahoma—Sewers and Water.

* * *

On an airport job in southwestern Kansas, the following contractors are doing the work:

J. H. Shears' Sons, Hutchinson, Kansas—Runway Pavement.

Charles Hulme, Great Bend, Kansas—Runway Pavement.

Geiger and Rutherford Construction Company, Leavenworth, Kansas—Grading.

D. G. Hansen, Logan, Kansas—Grading.

* * *

C. A. Tucker, of the firm of Cook and Tucker, Road Contractors, Ottawa, Kansas, is now a Lieutenant in the U. S. Engineer Corps. Al Tucker is one of the best highway construction and road engineers in the state. He started in as a youngster as a water boy on a construction gang. During all of his vacations between school terms, he was out on the construction work. Al is a graduate of the University of Kansas, and during the past several years has laid a large mileage of concrete highways. Not only is Al a fine engineer, but he knows the construction game from both angles; namely, working on the job and owning and operating an outfit.

* * *

The following contractors are working on the large housing project in south central Kansas:

Sherwood Construction Company, Wichita, Kansas—Excavation.

Inland Construction Company, El Dorado, Kansas—Paving.

Dobson and Robinson, Omaha, Nebraska—Gas Distribution System.

W. B. Carter, Wichita, Kansas—Water and Sewers.

Tom Nall has recently been appointed as Architect to the Board of Public Utilities, Kansas City, Kansas. The city operates its own water and light plant which is now being enlarged. Tom is an ideal man for the job. He is former State Architect of Kansas, holding this position in 1937 to 1939. Following that period, he was Architect to the HOLC.

* * *

Butler Brothers and Leslie, of Oklahoma City, were the only bidders recently on 110,000 cu. yd. excavation job, bids taken by the WPA for work at the Oklahoma City Municipal Airport. The bid price was $0.25 per cubic yard.

* * *

Moran and Buckner, Contractors of Muskogee, Oklahoma, were the low bidders on six miles of portland cement concrete pavement and five bridges, directly east of Oklahoma City. The bid price was in the neighborhood of $582,000.

* * *

The Standard Paving Company, of Tulsa, Spencer Construction Company and Lee Harris, are building an airport in northwest Texas. Reports are that they are ahead of schedule. These three companies make an excellent combination.

C. P. Owens, Missouri State Highway Engineer, of Springfield, Missouri, has taken a leave of absence from the State Highway Department and is temporarily managing engineer for Horner, Wyatt, Tanner and Mitchell, Board of Trade Building, Kansas City, Missouri. This company is architects and engineers for defense projects and has a number of Government contracts at the present time. Claude Owens is one of the best known State Highway Engineers in Missouri. Not only does he know many different types and phases of construction, but he also has exceptional ability in administrative work. Of the firm of Horner, Wyatt, Tanner and Mitchell, Horner, Wyatt and Tanner are all well-known architects throughout the Southwest. Anson Mitchell was formerly Chief Engineer for the J. C. Nichols Company, Real Estate Developers of Kansas City.

* * *

C. H. Piepmeier, formerly well known and well liked Chief Engineer of the Missouri State Highway Department, is now one of the main executives of the Durham Telephone Company in Durham, North Carolina. Mr. Piepmeier was the first State Highway Engineer of the Missouri State Highway Department after World War I. Mr. Piepmeier had charge of the spending of funds amounting to $135,000,000 voted in bonds by the people of Missouri to take the State Highways out of the mud. The excellent job that he did is one of the reasons why the State of Missouri now has one of the finest hard surfaced road systems of any state in the Union.

* * *

Colonel F. L. Scott, Southwestern Division Engineer, U. S. Engineer Corps, Dallas, Texas, recently announced the following construction contract awards. Under the supervision of the U. S. District Engineer at Denison, Texas, were the following:

Younger Engineering Company, San Antonio, Texas—The construction of buildings at airforce training schools at Altus, Oklahoma; Frederick, Oklahoma; and Childress, Texas

Dahlgren, Ryan, Beekman and Brooks, Oklahoma City Contractors —Airfield facilities at an airforce training school at Altus, Oklahoma

Cowden Brothers, Dallas, Texas—Buildings at an airforce training school at Ardmore, Oklahoma

Vilbig Construction Company, Dallas, Texas—Grading and drainage construction at an airforce training school at Frederick, Oklahoma

Russ-Mitchell, Inc., Contractors of Houston, Texas—Grading at an airforce training school at Ardmore, Oklahoma

Under the Tulsa, Oklahoma District Engineer, are the following:

Leo Sanders, Oklahoma City—Housing facilities and utilities at an airfield in Oklahoma County, Oklahoma

W. E. Price, Construction Company, Ellis-Nicholson and Cramer, and Oscar T. Boyington, Oklahoma City, — facilities at an airforce training school between Arkansas City and Winfield, Kansas

Harrison-Freeto-Kaw, Kansas City, Missouri—Paving at an airforce training school between Arkansas City and Winfield, Kansas

Harrison-Freeto-Kaw consists of Harrison Engineering and Construction Company, Kansas City, Missouri; Freeto Construction Company of Pittsburg, Kansas; and Kaw Paving Company of Topeka, Kansas.

Walco Engineering and Construction Company, Tulsa, Oklahoma—Utilities at an airforce training school at Dalhart, Texas

Black and Veatch, Engineers of Kansas City, Missouri, were awarded architect engineer supervision at an airforce training school at Independence, Kansas.

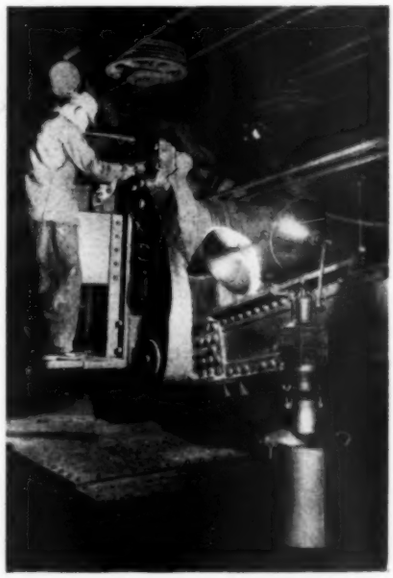
New Equipment and Materials

New High Water Retaining Concrete Curing Compound

A newly-developed concrete curing compound, produced by Truscon Laboratories of Detroit, Mich., is a clear liquid which is sprayed on the wet concrete immediately after finishing. When used on formed concrete it is applied as the forms are removed. This material, known as Tru-Cure, is stated to have been used with outstanding success on several large war jobs and highways in connection therewith — considerably expediting construction and producing concrete conforming to the very highest standards. An advantage claimed for Tru-Cure is that it seals and locks in the moisture immediately just as soon as the finishers are off the work, eliminating the several hours, to a day's time, which are usually lost on the average concrete job before curing can be started. Tru-Cure is stated to produce the equipment of a 14-day water cure, without any of the labor expense of hauling dirt, keeping surface wet. Laboratory tests are stated to have proved that Tru-Cure has moisture retaining qualities of very high limits—better than 96 per cent at 24 hours at a temperature of 110° F. or 90 per cent at 7 days. For more detailed information on this method of curing write the Truscon Laboratories, Detroit, and ask for Bulletin No. 534.

New Floodlights

A new line of portable floodlights has been announced by the National Carbide Corporation, 60 East 42nd St., New York City. The new NC-200 model (illustrated), which is the largest unit, has two 8,000 candlepower floodlights constructed on swing joints, thereby allowing independent directional control with 16,000 candlepower concentration of light. This portable floodlight may be used continuously or intermittently, and is always ready for instant use until the carbide charge is exhausted.



New Portable Floodlight

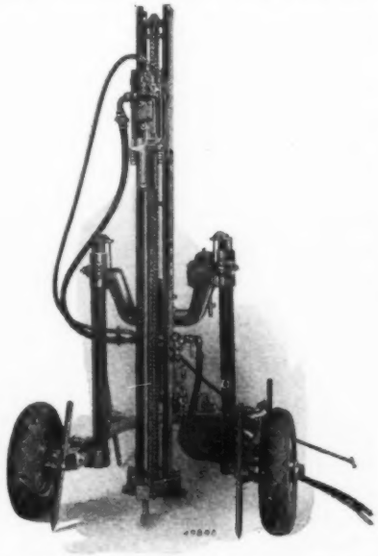
Substitutes for Tin-Base Babbitts

Two new lead-base bearing metals, known as Pyramid and Defender, have been developed by the Magnolia

Metal Co., 120 Bayway, Elizabeth, N. J., as substitutes for tin-base babbitts which are now so difficult to secure. Pyramid metal is stated to be well suited to applications where bearings must withstand heavy sustained pressures. Defender metal stands shocks without cracking and is stated to be well suited for use in internal combustion engines, trap rock crushers and sifter machinery.

Improved Drifter Drill

New features have recently been added to the X-71WD drifter, manufactured by Ingersoll-Rand Co., 11 Broadway, New York, N. Y. This drifter has been developed for wagon drill service, in which the drilling of deep holes is usually required. New

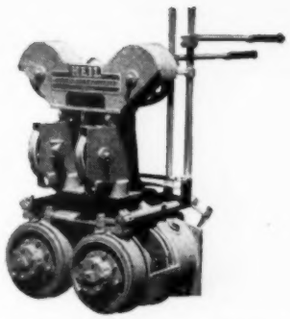


X-71WD with FM2 wagon drill mounting

features include a positive method of blowing—a method which directs more blowing air through the drill steel. Thus, little air escapes around the sides of the shank. The X-71WD has a long stroke and a heavy piston. These features — long stroke and heavy piston—provide strong rotation and striking force necessary to overcome the inertia of a heavy drill steel; they also permit the use of larger bits.

New Power Control Unit

A new power control unit, brought out by the Heil Co., 3000 W. Montana St., Milwaukee, Wis., has been designed and built for use with all makes of tractors from 50 to 150 H.P. According to the manufacturers this double drum model is an all-purpose unit providing 2-line cable control for operation of twin cable scoops, or for operating two single cable units such as a bulldozer-ripper combination. It is stated that every feature has been provided to insure increased output and reduce operating expense. Gears, bearings, shafts, housing and superstructure are all designed and tested to withstand a line pull of 8,000 lb. on the bare drum with ample safety factor. Unit has such features as heavy duty forged alloy steel main drive and reduction gears, with gears and bearings completely encased in an all-welded steel gear case. Garter type oil seals effectively seal the gear case



Heil Model S-2 New Power Control Unit

against oil leakage and dust infiltration. Clutches are bevel cone shaped and fitted with molded linings. Adjustments are easily and quickly made without disturbing any other parts of the unit. Brakes are positive self-energizing, and automatically hold load when operating levers are released. Rear power takeoff adapters are provided to attach this power control unit to all current models of Allis-Chalmers, Caterpillar, Cletrac, and International Harvester crawler tractors of 50 to 150 H.P. rating.

With the Manufacturers

Twin Disc Moves Hydraulic Division

New machines and new facilities are now being installed in the Twin Disc Clutch Co.'s plant at 1310 Preston St., Rockford, Ill., and a considerable increase in the number of employees will take place very shortly. The expansion results from the creation of a separate division of the Twin Disc Clutch Co. to handle the development, production and sale of hydraulic drives and torque converters, formerly a department of the company's operations at Racine, Wis. R. M. Schaefer has been named vice-president in charge of the Hydraulic Division of the Twin Disc Clutch Co., all of the activities of which now will be concentrated in Rockford. The products to be manufactured involve fluid-type transmissions, which are finding ever-increasing applications in many industrial fields. This development has been carried on extensively by the Twin Disc Clutch Co. for the last five years. A considerable number of these units, which were previously produced in Racine, are now in service in a wide variety of equipment operating throughout the United States as well as in South America and Canada. Further engineering research and development will be carried on by the staff of Twin Disc engineers recently transferred from the Racine plant to the laboratories now made available in the Rockford plant.

W. M. Black Now Vice-President Brake Shoe Co.

William M. Black was made a vice-president of The American Brake Shoe and Foundry Co. at a recent meeting of the board of directors. The appointment became effective at once. Mr. Black has been president of the American Manganese Steel Division of The American Brake Shoe & Foundry Co. since 1940 and will continue in that capacity. He joined this division in 1912 and became its general sales manager in 1934 and vice-president in 1935. Mr. Black served as a lieutenant of ordnance in World War I. The American Manganese Steel Division has six plants throughout the United States, the largest being at Chicago Heights, Ill., where the general offices are located. The "Amsco" division manufactures a wide range of manganese steel castings, power shovel dippers, material

W. M. Black

handling and industrial pumps, heat and corrosion resisting alloys and special welding rods.

Briody Becomes Field Engineer Keystone Asphalt Products

B. C. Briody

Appointment of B. C. "Mike" Briody as field engineer for Keystone Asphalt Products Co. has been announced by T. R. Johnson, sales manager. Briody, former vice-president in charge of the highway division of Truscon Steel Co., has been in the construction field for 32 years. In his new capacity he will work with construction engineers in introducing the new Keystone centerstrip and other Keystone construction products. He will make his headquarters at the Chicago office of the company.

L. H. Chenoweth Goes to WPB

L. H. "Larry" Chenoweth, Manager, Manufacturers' Sales, in the Industrial Products Sales Division of The B. F. Goodrich Co. has been granted a leave of absence to serve on the Rubber Products Division of the War Production Board. Chenoweth joined B. F. Goodrich in 1914 soon after his graduation from Harvard University, and has held a wide variety of sales posts in the Industrial Products, formerly the Mechanical Goods Division. While he is on leave Chenoweth's duties in the company's Washington Office are being handled by I. N. Kimsey, Akron District Manager.

Sanford Co. to Handle Rex Equipment

Chain Belt Co., Milwaukee, Wis., has appointed Sanford Tractor & Equipment Co., 500 East 4th St., Reno, Nev., as distributor of Rex construction machinery in the state of Nevada. Sanford Tractor & Equipment Co. carries a stock of Rex small mixers and Rex pumps and maintains an excellent service shop to give contractors in their area quick and reliable service. The company is headed by Leslie M. Sanford, president. He and his associates have had wide experience in the construction industry and are well qualified to serve the construction trade. Sanford Tractor & Equipment Co. has a complete line of construction machinery to offer the contractors.

Appoint Mather to Engineering Staff at Willys

Appointment of Roger Mather, formerly of the Inland Steel Co. to the engineering staff of Willys-Overland Motors, Inc., has been announced by Delmar G. Roos, Vice-President in Charge of Engineering. Mr. Mather, who is a graduate of Cambridge in England, and of Massachusetts Institute of Technology, has been in the steel business for many years. He will serve Willys-Overland in a consulting capacity and assist the company in working out various metallurgical and chemical problems.

International Harvester Entertains Dealers

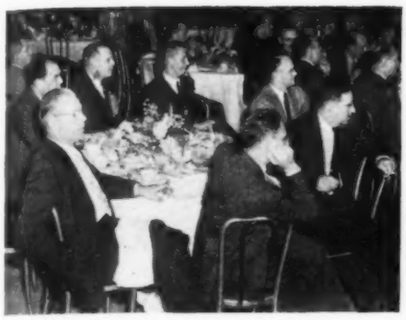
International Harvester officials recently entertained at luncheon a large group of their industrial power dealers who were attending the semi-annual convention of the Associated Equipment Distributors. The luncheon was held at the Edgewater Beach Hotel, Chicago.

Neal Higgins, manager of industrial power equipment sales, served as host and chairman. The speakers included Fowler McCormick, president, and J. L. McCaffrey, second vice president. L. W. Gardner, president of the Howard-Cooper Corporation, Portland, Ore., spoke for the dealers. The illustrations show some of those present at the meeting.

Reading from left to right: William A. Browning, president, Browning-Ferris Machinery Company, Dallas and Houston, Texas; Neal Higgins, manager, industrial power sales, International Harvester Company, Chicago; T. B. Hale, sales manager, International Harvester Company, Chicago; Henry Jameson, manager, tractor equipment sales, Bucyrus-Erie Company, South Milwaukee, Wisconsin; W. H. McIlhany, general manager, Roanoke Tractor and Equipment Company, Roanoke, Virginia; C. C. Gray, International Harvester Company, Chicago; L. G. Harrod, president, Harrod Equipment Company, Syracuse, New York; and P. H. Birckhead, sales manager, Bucyrus-Erie Company

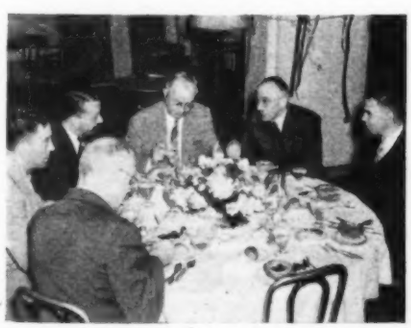
Reading from left to right: V. D. Freeborn, president, Freeborn Equipment Company, Inc., Olean, New York, and Oil City, Pennsylvania; H. T. Reishus, manager, eastern district, International Harvester Company, Chicago; and John H. Gorman, president, Tractors, Inc., Cranston, Rhode Island

Reading from left to right: R. S. Rosholt, vice president, T. W. Rosholt Company, Minneapolis, Minnesota, and director of the Associated Equipment Distributors; A. J. Peterson, assistant sales manager, and Fowler McCormick, president, International Harvester Company; and T. W. Rosholt, president, T. W. Rosholt Company



Reading from left to right: Fred Ramsen, industrial power representative, International Harvester Company, St. Louis, Missouri; John H. Brooks, president, Ray-Brooks Machinery Company, Inc., Montgomery, Alabama; E. F. Higginbotham, general manager, Road Builders Equipment Company, Memphis, Tennessee; Frank M. Adams, vice president, Missouri-Illinois Tractor and Equipment Company, St. Louis, Missouri; Forest D. Siefkin, general attorney, International Harvester Company, Chicago; and Thomas H. Ryan, president, Ryan Equipment Corporation, St. Louis, Missouri

Reading from left to right: R. M. McCroskey, manager, agricultural tractor sales, International Harvester Company, Chicago; A. W. Scarratt, vice president in charge of engineering and patents, International Harvester Company, Chicago; L. R. Simmons, president, Mississippi Road Supply Company, Jackson, Mississippi; L. W. Gardner, president, Howard-Cooper Coporation, Portland, Oregon; and R. C. Archer, director of domestic and Canadian sales, International Harvester Company, Chicago



Reading from left to right: W. W. Williams, secretary, W. W. Williams Company, Columbus, Ohio; Robert Campello, district traveler, Bucyrus-Erie Company, South Milwaukee, Wisconsin; J. C. Lanius, assistant to vice president and W. R. O'Brien, sales manager, Great Lakes Supply Corporation, Chicago, Illinois

Diesel Engine Corporation Announces Change in Name

The Rogers Diesel and Aircraft Corporation now has the new corporate name of The Cummins Diesel Engine Corporation of New York. The corporation operates two New York plants, 1120 Leggett Ave., and 724 Garrison Ave., with offices situated at the former address. Originally formed in 1934 as a distributing organization for Cummins diesel engines, the corporation has since enlarged its scope of operations and its facilities to the point where a new corporate name was needed to describe more adequately the nature of its business. Although continuing as a distributor for Cummins engines, Rogers Diesel and Aircraft Corporation now represents Enterprise and Sheppard Diesel Engines also, and, in addition, manufactures a complete line of gasoline and diesel-driven generator sets and power and pumping units.

Industrial Equipment Co. Appointed Distributor for Rex Construction Equipment

Chain Belt Co., Milwaukee, Wis., has appointed Industrial Equipment Co., 1301—59th St., Oakland (Emeryville), Calif., as distributor of Rex construction machinery in the Bay area. Mr. R. W. Christofferson is general manager and Ray Smith, sales manager. They are very well known in this area as are other members of their organization. Industrial Equipment Company has a new, modern place of business at the above address with excellent service facilities manned by experienced service mechanics. A complete line of Rex mixers and pumps is carried in stock for immediate delivery and the company will specialize in the sale and rental of this as well as other new construction machinery.

Somerville Appointed General Manager Wire Rope Division

P. P. Somerville has been appointed general manager of the Wire Rope Division of the Jones & Laughlin Steel Corporation. He succeeds the late Robert Gilmore. Mr. Somerville has been with Jones & Laughlin since 1938 when he started with the company to supervise installation of equipment in the plant then under construction at Muncy, Pa. When the new plant went into production he was appointed Superintendent which position he has held since. Mr. Somerville's entire business experience has been in the wire rope business, having entered the production division of the Williamsport Wire Rope Co. in 1929 upon his graduation from the University of Notre Dame as a mechanical engineer.

P. P. Somerville

Becker Made Branch Manager for Gar Wood Industries

R. A. Becker has been appointed manager of the Baltimore branch of Gar Wood Industries, Inc., Detroit, according to Mr. W. H. Hammond, vice-president and director of branches. R. J. Grow, former manager, has joined the U. S. armed forces as a first lieutenant. The Gar Wood Baltimore branch is located at 2267 Kirk Ave., Baltimore.

R. F. Bergmann Appointed Chief Engineer of Link-Belt

R. F. Bergmann

Announcement has been made by Link - Belt Co. that Richard F. Bergmann has been appointed chief engineer for the company, with office at executive headquarters in Chicago. William W. Sayers, who has served in this capacity since 1925, has been appointed consulting engineer. In this newly-created position he will continue to deal with patent matters and be available for consultation where his extensive knowledge of the company's engineering problems will be helpful. Mr. Bergmann had been assistant to Mr. Sayers from 1933 to 1936, when he resigned to become chief engineer of Rayon Machinery Corp., Cleveland, O., from which position he now returns to Link-Belt. He is a native of Logansport, Ind., was graduated from Rose Polytechnic Institute at Terre Haute, Ind., in 1918, and joined Howe Chain Co., Muskegon, Mich., after brief service as an ensign in the U. S. Navy during World War No. 1. Following merger of Howe Chain Co. with Link-Belt Co., he was transferred to Chicago in 1924, first becoming chief engineer of the Link-Belt Caldwell plant, and in 1933, assistant to the chief engineer of the company. Mr. Sayers is a graduate of the University of Illinois, 1897, and a member of the A.S.M.E. He has been associated with Link-Belt Co. for the last 39 years, and in this time has very ably held numerous responsible positions.

W. W. Sayers

Sontag Joins Staff Baldwin-Southwark

Alfred Sontag has joined the staff of the Testing Machine Department of The Baldwin Southwark Division of The Baldwin Locomotive Works, Philadelphia. Mr. Sontag, who was for 10 years chief engineer and sales manager of the Riehle Testing Machine Division of American Machine and Metals, will be active in testing machine production and development.

New Trade Literature

Trail-Dump.—The Model 120 Koehring trail-dump is described and illustrated in a new catalog issued by Koehring Co., 3026 West Concordia Ave., Milwaukee, Wis. This model has been recently developed and presented for sale within the last year. The catalogue has 50 illustrations, 16 pages in color. It presents the machine as a complete unit, with individual assembly illustrations, clearly depicting the operating functions and the many special features.

Causes of Axle Failures Explained.—The Timken-Detroit Axle Co. has made available, as a further addition to its "A.M." (Axle Maintenance) program, a reprint of four "Failure Analysis" articles from past issues of Timken Axle News. These articles analyze the causes of failures of (1) Front Axle Parts, (2) Axle Shafts, (3) Gears and Pinions, (4) Differentials, and explain how such failures can be avoided. A copy will be mailed without charge upon request to The Timken-Detroit Axle Co., Detroit, Mich.

Soil Stabilization.—Kotal Co., 52 Vanderbilt Ave., New York, has issued a new bulletin—No. 9 of its series dealing with the various applications of Kotal to bituminous road and runway construction. This new bulletin describes the operating methods for stabilizing soils with asphalt cutback and Kotal which, it is claimed, permits the use of soils running very high in moisture content and eliminates the need for accurate moisture control.

Surface Consolidation and Maintenance with Calcium Chloride.—This recently issued bulletin is particularly timely, as it describes methods for accomplishing road improvements under restricted war conditions. The new 62-page booklet gives a detailed and illustrated presentation of the method and procedure in consolidation operations. It may be obtained without charge by writing to the Calcium Chloride Association, 4145 Penobscot Bldg., Detroit, Mich., and asking for Bulletin No. 29.

Fatigue of Metals.—In September, 1941, The Nitralloy Corp., 230 Park Ave., New York, N. Y., brought out a 45-page booklet entitled "Fatigue of Metals, Some Facts for the Designing Engineer." This booklet, free from any advertising, has been in such demand by engineers, schools, colleges, universities and government technical bureaus that the Nitralloy Corp. began at once collecting material for a second edition. This second edition, more than twice the size of its predecessor, will be ready for distribution by August 1.

Parts for Construction Machinery.—Alloy Steel & Metals Co., 1862 E. 55th St., Los Angeles, Calif., has issued a circular illustrating some of the parts of wear resisting steel that it manufactures for construction equipment. Included are crawler shoes, crusher jaws, tractor rims, shovel buckets, trencher buckets, cast steel gears and pinions, rollers, sheave wheels, ditcher links, etc.

Clearing House

FOR SALE:

30 x 10 Portable CRUSHING PLANT
4 x 8 Telsmith Vibrating SCREEN
3—800 x 1,000 Gal. DISTRIBUTORS
18 in. x 200 ft. BELT CONVEYOR
½ yd. Owen CLAMSHELL
2—1,000 ft. DIESEL AIR COMPRESSORS
30—1½ yd. and 3 yd. DUMP CARS
6 ORANGE PEELS—6 to 27 ft.
100 H.P. Lambert three drum ELEC. HOIST
5 Parsons & Cleveland TRENCHERS
2—2½ and 3 ton tandem gas ROLLERS
½ yd. P. & H. Gas Cat. Dragline
5—6 to 10 Ton Gas Locomotives
9 Vulcan & McKiernan Terry Pile Hammers
5 Gunite NI & N2 Cement Guns

Tidewater Equipment & Machy. Corp.
305 Madison Ave. New York, N. Y.

FOR SALE

One Ingersoll-Rand
AIR COMPRESSOR
8,000 C.F.M. 4,600 R.P.M. discharge 100 lbs. gauge. Serial No. 123.

One Ingersoll-Rand
STEAM TURBINE
1750 H.P. at 175 lbs.

ONE SURFACE CONDENSER
Ross Heater Co.
4,100 square feet, 54" diameter.

Two Feed Water Heaters
BASCULE BRIDGE
modern design—installed 1935
For further details inquire

ALBERT A. VOLK CO.
1819 Broadway, New York City

FOR IMMEDIATE RENTAL

1650 Gal. capacity Asphalt or Tar hauling truck—insulated tank—equipped with dual high power burners and dial thermometer GMC truck.
Portable 1000 Watt Kato Light Plant, Wisconsin Motor, 110 A. C.

Leicester Contracting Corporation
Wayne, Penna. **Wayne 0925-R**

FOR SALE

One—Type "DX" Jaeger Combination Finisher and Spreader; for asphalt or concrete.

The Barber Equipment Co.
7 So. Dearborn St.
Chicago, Ill.

SPECIALIZED SERVICES

TIRES REPAIRED

18.00x24 down to wheelbarrow size.
Full line of new and used tires.

WALLACE TIRE SERVICE, Inc.
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WANT TO BUY

2 Locomotive Cranes
2 Whirley Cranes 80' or 125' Boom
5 Portable Conveyors 40' to 60'
3 1½ to 2 ton Tandem Rollers
6 10,000 Gal. Cap. Steel Tanks
1 Mile Portable Track

Leicester Contracting Corporation
305 Madison Ave., New York, N. Y.

FOR SALE OR RENT

1—P & H 600 1 yard combination shovel and dragline.
1—Michigan ⅝ yard truck crane with shovel & clamshell.
1—¾ yd. Bucyrus Erie dragline bucket.
1—¾ yd. Page Dragline bucket.
1—1½ yd. Page Dragline bucket.
1—⅜ yd. Bay City dragline bucket.
1—Shovel boom with ⅝ yd. bucket for ⅝ yd. Michigan truck shovel.
1—⅜ yd. Kiesler clamshell digging bucket.
3—Gallon 10 ton 3-wheel gas rollers.
2—Huber 10 ton 3-wheel gas rollers.
1—10 ton Gallon Chief 3-wheel Diesel roller complete with electric starter and scarifier.
1—5 ton Gallon gas roller 5 ton 3-wheel.
2—Thor-LeRoi 105 gas driven portable compressors.
1—220 cubic foot Sullivan gas driven portable compressor.
1—Demonstrator LeRoi 210 cu. ft. 2-stage gas driven compressor.
1—105 cu. ft. 2-stage Schram compressor.
1—105 cu. ft. Utility Type Schram compressor mounted on Chevrolet truck.
2—Cleveland Model DR8 Wagon Drills.
1—Cleveland Model DA10 Wagon Drill.
15—Kohler 1½ KVA, 1500 Watt AC gas engine driven light plants.
8—Kohler 1500 Watt, 110 Volt DC engine driven light plants.
2—Worthington pneu. backfill tampers.
1—No. 80 Cleveland pneu. rivet buster.
1—300 amp. Lincoln gas driven welder.
2—4" Carver Centrifugal pumps.
1—8' Adams pull grader.

Chicago Construction Equipment Company
Phone: Radcliff 5800
8020 S. Halsted St., Chicago, Illinois

EQUIPMENT FOR SALE

FOR SALE
ONE AUSTIN-WESTERN "99" Power Grader, purchased new, fall 1941. Used one month. Drives and steers on all four wheels, hydraulic controls blade, scarifier, and steering. Reason for selling, too large for city street work. Address Commissioner of Streets and Public Works, City Hall, Owensboro, Kentucky.

FOR SALE
1—Cletrac Tractor, Diesel—92 H.P. Rebuilt, Serial No. 6060.
1—Austin Western 12 yard Hydraulic Scraper, Serial No. 12590—Practically new.
1—All purpose Equipment Trailer, 20 ton capacity—with platform 8 x 10 feet. Equipped with 12 (twelve) 750 x 15 tires.
Address Box 482, Roads and Streets 330 So. Wells St., Chicago, Ill.

JAEGER MODEL MP-2, Road Builder Travel Plant, excellent condition, complete with conveying attachment and extension feed auger, also spreading attachment, 150 H.P. Waukesha gasoline engine. FOB a point in Oklahoma. **Address Box 483, Roads and Streets, 330 So. Wells St., Chicago, Ill.**

MODEL 522 Rebuilt Barber-Greene pneumatic tired Bucket Loader, service belt conveyor discharge. Located in Kansas. **Address Box 484, Roads and Streets, 330 So. Wells St., Chicago, Ill.**

ONE used 10" Belt Driven Amsco Sand and Gravel Pump on skids. Located in Oklahoma. **Address Box 485, Roads and Streets, 330 So. Wells St., Chicago, Ill.**

UNIVERSAL 9" x 36" Jaw Rock Crusher. Good used condition. Located in southern Missouri. A bargain. **Address Box 486, Roads and Streets, 330 So. Wells St., Chicago, Ill.**

HELP WANTED

SALESMAN—For established auto parts and machine shop, calling on garages, fleets, contractors in Philadelphia. Salary and commission. Good permanent position for high type successful man experienced in this line. Apply by letter only to Auto Gear & Parts Company, 96 East Baltimore Avenue, Lansdowne, Pa.

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New or Rebuilt
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Headquarters for REPAIRS — any make. Factory Service. We will also *buy* your old instruments or take them in *trade*.

A complete line of Engineering Instruments and Equipment for Field or Office. Write for Builetin RS 77.

WARREN-KNIGHT CO.
Manufacturers of Sterling Transits and Levels
136 N. 12th St. Philadelphia, Penna.

EQUIPMENT FOR SALE

1—Austin-Western 4-44 — all wheel drive and steer — 9.00 x 24 dual rubber tired tractor.
1—Cletrac DDH tractor.
1—Caterpillar "60" gasoline tractor.
1—Ateco scraper to fit Cat. "60".
1—Niagara 2 deck 3' x 8' screen.
1—Austin-Western 32" x 14' revolving screen.
1—6" Centrifugal pump — 2 stage — with 4 cylinder Hercules motor.
1—No. 104 Austin Gyratory crusher with back gear.

Subject to prior sale.

TELFORD EQUIPMENT COMPANY
319 East North St., Lansing, Michigan
Tel. 4-3424

POSITION WANTED

POSITION WANTED by middle aged dirt mover and paving foreman. 25 yrs. experience as Supt. and Foreman on all classes of work with all makes of equipment. Available at once. Dependable and sober. References. Address Box 489, Roads and Streets, 330 So. Wells St., Chicago, Ill.

INSTRUMENTMAN, Age 35, single. Can go anywhere immediately on notice. Experience record gladly sent. Draft classification 1-B. Write. **Box 78, Bandana, North Carolina.**

POSITION WANTED — Asphalt Paving Superintendent, 30 years experience. 56 years of age. **Box 488, Roads and Streets, 330 So. Wells St., Chicago, Ill.**

POSITION WANTED—Superintendent or Foreman, 10 years' experience on General Construction, bridges, culverts, foundations, concrete masonry, clearing, grading, sewer and water systems, revertment, cofferdams, pile driving, landscape plantings. Good pusher, age 31, draft classification 3-a. Single, Sober, American Citizen. Will go any place. **Box 475, Roads and Streets, 330 So. Wells St., Chicago, Ill.**

POSITION WANTED—Thoroughly experienced steam and gas shovel, dragline and crane operator. **W. H. Hanna, Pleasant Lake, Indiana.**

Index to Advertisers

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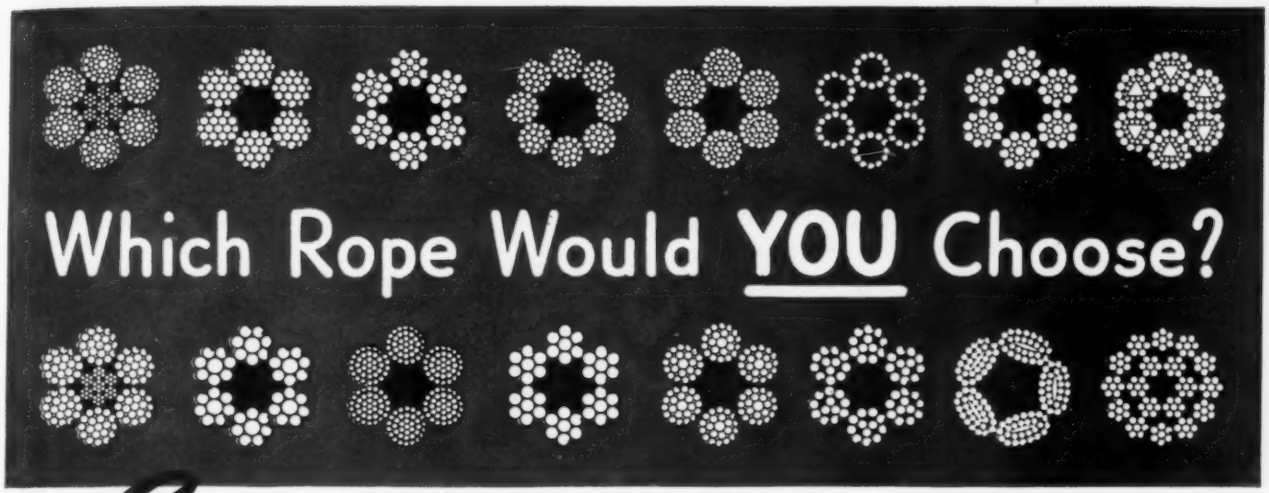

Economy DEPENDS ON THE RIGHT CHOICE

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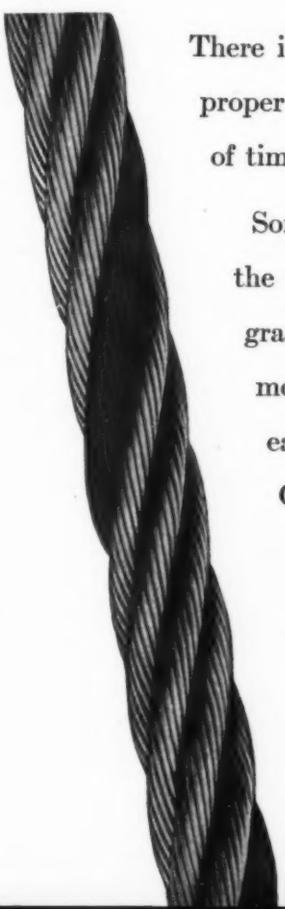

There is a wire rope for every application. Make sure you are using the proper rope on each installation. The wrong rope can be extremely wasteful of time, money and steel.

Some machines have sheaves which impose severe bending strains on the rope. On some machines the cable drags through abrasive stone, gravel or rock. Some ropes must endure the heat of handling ladles of molten metal, while others must run at excessively high speeds. For each job there is a one best rope, not only in construction but grade. Consult an American Cable engineer.

Ask him also about American Cable **TRU-LAY PREFORMED** wire rope. **TRU-LAY** has set new and higher standards for wire rope service. Conserve steel, time and money by using the proper construction and grade of **American Cable TRU-LAY Preformed.**

AMERICAN CABLE DIVISION
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AMERICAN CHAIN & CABLE COMPANY, Inc.
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ESSENTIAL PRODUCTS . . . AMERICAN CABLE Wire Rope, TRU-STOP Emergency Brakes, TRU-LAY Control Cables, AMERICAN Chain, WEED Tire Chains, ACCO Malleable Iron Castings, CAMPBELL Cutting Machines, FORD Hoists and Trolleys, HAZARD Wire Rope, Yacht Rigging, Aircraft Control Cables, MANLEY Auto Service Equipment, OWEN Springs, PAGE Fence, Shaped Wire, Welding Wire, READING-PRATT & CADY Valves, READING Electric Steel Castings, WRIGHT Hoists, Cranes, Presses . . . *In Business for Your Safety*

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— — on streets of 1500 U.S. cities

— — on thousands of miles of U.S. highways

Unessential driving on the nation's streets and highways is being cut to the bone.

But within cities and between cities, our arteries for motor vehicle traffic still have a big job to perform—carrying vital war materials—speeding the movement of troops and their mechanized equipment — providing transportation for workers in defense industries.

Resilient, heavy-duty TEXACO Asphalt pavements play an important role in keeping this essential traffic rolling swiftly, safely, surely. TEXACO Asphalt pavements in 1500 U. S. cities and towns, together with thousands of miles of TEXACO-paved U. S. highways contribute vitally to the speed and efficiency of America's war effort.

THE TEXAS COMPANY, Asphalt Sales Dept., 135 East 42nd St., New York

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